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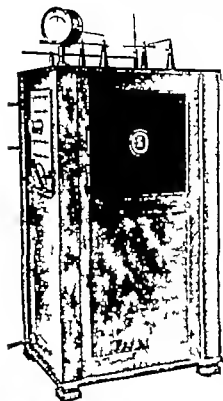
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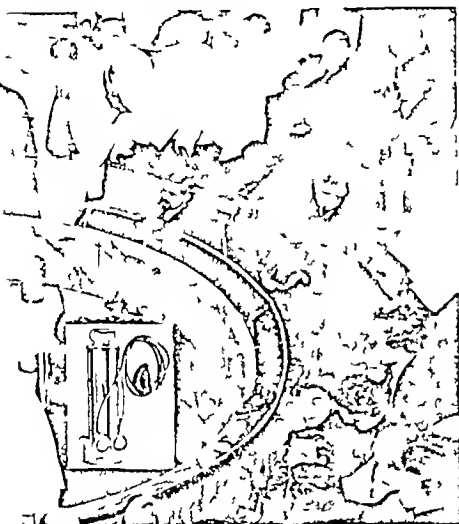
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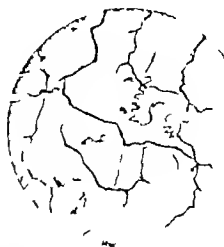


Fig. 3 (above) Case . Presenting vesiculopapular elevations typically observed during acute exacerbations — associated diffuse inflammation.

Fig. 5. Case 3. Similar lesion to that in Fig. 3, but showing sharp demarcation between edge of patch and area of normal mucosa.

Fig. 2 (above) Case . Apparent pigmented, patchy ecthymotic appearance seen during interval period. This case had previously shown the lesion seen in Fig. 3.

Fig. 7. Case 4. Typical of interval appearance. Two months prior to time of taking this picture this bladder had shown the most extreme type of edema of the variety illustrated in Figs. 3 and 5.

(Frederick B. Charlton)

SURGERY, GYNECOLOGY AND OBSTETRICS

AN INTERNATIONAL MAGAZINE PUBLISHED MONTHLY

VOLUME XXIII OCTOBER 1916 NUMBER 4

CYSTITIS SEXUS FEMINAE

WILLIAM FRANKLIN HATHORN, M.D., D.D.

PERHAPS fifteen years ago the most encountered bladder ailment of which I am now able to treat is a large and common one. Neither at that time nor more recently have I found any adequate account of it in the literature. These patients have been treated in a symptomatic way but I do not believe that there be any clear understanding of the mechanism. That I believe myself to be the primary report.

In all I have seen approximately fifty cases. Most of them have been merely lost sight of. No satisfactory series of cases is now available except in a few recent ones. In many a comprehensive chart recorded but never ever made. The case have occurred in my own personal large collection with other physicians and in hospital and in private service. Because of the hopelessness of drawing in worth while conclusions from such fragmentary record I have abandoned that idea altogether and shall simply cite the typical history, course and procedure and present a few exceptional and picturesque views in color that are a true reproduction of picture seen in real cases.

My observation and conclusion then are in the way of generalities with however some obvious and definite features. My excuse for such a generalization is simply to call attention to what I believe to be an un-

truthful illustration of a disease that may be helpful to many and ultimately to the patient.

All but not many have been treated with medicine and but none with surgery. These symptoms are in the nature of a continuing drawing and mounting pain.

In the history resemble me why I was not seen in the male. My assumption is that I have felt that the hyperplastic process is a different kind of obstructive symptomatic that might break the period of the bladder. Moreover reported in the literature with it a complicating trauma and procedure but since may be peculiarly contributory cause. Certainly I have not seen the more highly pitched infection of the bladder in the male bladder that prevail in these age period.

Let me briefly cite a typical history. A woman long past the menopause in her several children in reasonably good general health came with bladder complaint. She will most likely deny any history of bladder trouble in earlier life. The symptoms will have arisen gradually without acute onset but will persist with variable periods of comfort or distress throughout the entire life of the patient. The prognosis now implies then in essentially chronic disease. Probably a bladder once succumbing to such arophic change that which is added infection of varying types can never be restored to better

than a merely comfortable condition. Attacks will recur with lowered general resistance bad weather conditions etc.

Its first occurrence is as a rule late after sexual life has terminated. There comes a gradual recognition of undue frequency of urination with tenesmus and burning. From time to time in its course the acute exacerbations may be severe and occasion much loss of sleep and worry resulting in distinct physical and mental impairment. Such sharp attacks may persist for weeks, followed by months of comparative comfort. The urine at its worst, may be clouded with mucus and pus, and occasionally though rarely blood stained. I have never seen a urine that was grossly thick and ropy with pus and mucus, as we often see it in cystitis cases in younger individuals and in old prostatics.

The bacteriological findings have been variable and in no way consistent. Staphylococci are practically always in evidence, colon bacilli and allied forms occasionally in one case a chain bacillus whose place in the nomenclature we never determined. Tubercle bacilli we have never found to be a factor in spite of the sometimes suggestive appearance. The smegma bacillus was almost invariably present unless excluded by care in procuring the specimen. In short, in those cases that we have studied a determinative infection has not been identified. It may not be a specific infection and this is our belief but a condition developing after many differing bacterial onslaughts in bladders already weakened by the processes of senile decay. Again, many of the forms that we find may be saprophytic there as a result of favorable soil conditions rather than as causative factors.

One of our active workers along the lines of surgical pathology suggested that I might find these cases to be secondary to various degrees of prolapse following the lacerations and relaxations of pregnancy. He thought that the prolonged air and clothing contact with perversion of secretions would in part account for the senile vaginitis and that this might be the primary source of infection with the bladder condition secondary. Certainly in several of my more recent cases this

has not been true and I am skeptical of it as definitely etiological.

One of the illustrations here shown is an extreme case in an unmarried woman of sixty four my only exception to the rule of the multipara. Here the vagina would only admit the little finger and there was nothing of relaxation or prolapse.

Often the bullous patches are sharply outlined in grouping from healthy perfectly normal bladder mucosa, as distinctly so as a Zoster eruption on the skin. This has suggested the possibility of its being akin to a recurrent chronic Herpes. Without going into lengthy discussion this theory hardly appeals to me as being adequate to explain the allied changes in the rectal and vaginal mucosae.

Almost without exception the condition is common to bladder, vagina, and rectum simultaneously. The clinical picture of senile vaginitis is so common that I shall not take time to comment on it except to say that it is always present and recognized that it most often receives all the attention and treatment for relief of the sometimes vague pelvic distress when it is only one of the triad of troubles.

The vaginal change is usually looked upon as a shrinkage of subcutaneous tissues with atrophic disturbances in the epithelium and resulting painful erosions or even ulcerations. Add to this bacterial invasion with inflammatory exudates and the future course is not difficult of imagination. If this brief paragraph is true applied to senile vaginitis, I believe it holds equally true of the accompanying bladder change and of the almost consistently present degeneration of rectal mucosa.

The vagina has not been included in the accompanying illustrations in spite of its invariable participation. I have presented however the rectal picture to accompany each bladder drawing. The rectal mucosa has varied in its appearance all the way from multiple punctate erosions to large distinct punched out areas of ulceration on an otherwise normal pink velvety base but still a darker ground shade than applies to a normal bladder.

At this point the question of syphilis might

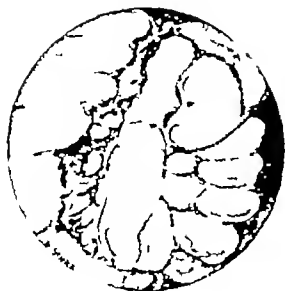


Fig. 1. Bladder, post mortem



Fig. 2. Bladder, post mortem

propriety. I would reply that in most instances I studied myself from behind, even when I had my first disease and in recent years have repeatedly found the view correct, although not always Weismann.

The prostate has not exactly parallelled the view that benign prostatic hypertrophy or adenitis degenerates into carcinoma, but it might be counted for in the traumatic etiology, and the greater likelihood of a venous metastasis.

Autopsy has never been obtained in a malignant bladder cancer, and with this pathological fact before me in any case under my direct charge, and the conclusion is that it can hardly be regarded as even a tributary to a fatal termination.

If any actual histopathological tubercle has been made elsewhere and are available applying to the vaginal wall in some vagina, I believe that in all essential the findings there would correspond very closely to the result in bladder like in the group of us.

The cystoscopic appearance in two recent cases has presented a rather remarkable likeness to tubercle, yet the elevated nodules as I have been in the habit of calling them in individual cases contained evidently clear serum and in such case that I have supposed your fat mistake to be my fault.

the other appeared but helped not him to see in them with the cystoscope, but that the entire bladder is covered with exactly tubercle in pathologic. The microscopic appearance is entirely that which has been mentioned in presenting the plot. One illustration here, and the other will apply to that which is to be applied in the study of the bladder. In two of these cases, yet in the present examination, the vessel in the structure of the bladder, and the other three with the bladder appear in the bladder, and the extent of the study.

Often the cystoscopic picture is given by the plot, but it is not the same, but by the time of the fullness, but the term has been merely a histological application of the word in the present study, and it is not a type of cystitis, but tubercle, and in more strictly to hyperplastic picture.

The disease is not in the bladder, but in the bladder, however, which is not the same, where the bladder has been run in remarkable parallel and with a generally uniform symptomatology. The cystoscopic picture varies at different times, but in the end characteristically some occur at two months, ranging from an acute vascular inflammation to a mild chronic.

Degenerative changes are recognized



Fig. 6. Case 3. Superficially eroded appearance in patches throughout rectal pouch. Accompanies Fig. 5

in other mucous membranes. Bronchitis in the old becomes almost the rule. A chronic conjunctivitis with thickened and everted lids is all too common. Nasopharyngeal catarrh in the old becomes the bane of the family physician. Perhaps this bladder difficulty has simply to be added to that group.

The general management of these old women will be apparent the best of general care and hygienic control. The usual hot boracic irrigations are quickly beneficial. Argyrol in instillation is helpful. The rectal and vaginal irritation can perhaps best be met by the hot alkaline douche the interval of douching being gauged by the comfort obtained. Vigorous local treatment, such as application of strong silver. I have felt to be out of place since the problem seems to be one more of comfortable management than of cure. Pure liquid guaiacol internally is a drug possessing almost specific properties. It almost invariably brings remarkable and quick relief from the frequency of urination with tenesmus and burning when given in five to ten drops doses after each meal. Its use is in a way empiric. Some one has claimed that its benzoic acid radical is broken up and eliminated by the kidneys as hippuric acid. This being a normal urinary acid may play some definite part in the relief which we do not pretend to explain. It may be resorted to whenever discomfort is experienced

and taken for indefinite weeks or put aside perhaps for many months during the intervals of comparative comfort.

To discuss cellular and tissue changes due to age decay along purely biological lines as has been so ably done by Metchinkoff and many others is not my province yet I do feel that in this group of cases has been overlooked a pathological entity worthy of better recognition and a name. Tentatively I suggest *cystitis senilis feminarum* for lack of a better.

CASE 1. Mrs. W. age 60, multipara previous health good first experienced bladder symptoms at 64. At that time I found cystoscopically practically the same condition as when examined recently. At this later examination Fig. 3 (frontispiece) was taken, which gives the typical patchy grouping of vesicles seen at the height of attack. She has had several long periods of complete relief during these years. Figure (rectal) accompanying shows distinct elongated ulcerated fist above the internal sphincter bleeding on touch with a cotton swab.

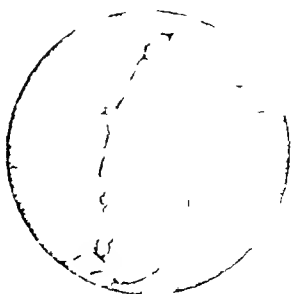
CASE 2. Mrs. C. age 60 multipara previous health good mild bladder symptoms presented about the age of 50. Some years later was cystoscoped, the bladder showing irregular patchy ordem. Recently during an interval of comfort Fig. 3 (frontispiece) was taken and presents the typical pigmented appearance and chronically thickened vessel walls remaining after repeated cut excoriation. Figure 4 shows an ulcerated eroded area in the rectum. This patient has suffered from *hemorrhoids* for twenty years.

CASE 3. Mrs. O. age 58 mother of one child. Note that she has not menstruated since that childbirth thirteen years ago (cause unknown). During these years she has grown very heavy until her obesity has become a burden to her. Bladder symptoms first developed nine months ago. There have been short intervals of relief. Figure 5 (frontispiece) taken during an exacerbation, shows the typical vesicular patchy lesion at the height of an attack. This is the one exception to my series, in point of age yet here we had years ago atypical or pathological menopause, so that the "contradiction" after all not so great. Both vagina and rectum present superficially congested erosive areas. Fig. 6 presents a granulated appearance of the rectal mucosa.

CASE 4. Mrs. L. age 68 multipara previous health good. At 56 slight bladder trouble first became evident with variable intervals of relief since. It has been more persistent during the last three years. January 3, 1906 she presented the most extreme cystitis of this vesiculated patchy form that I had ever seen. I brought her back March 5 to get picture, which is shown in Fig. 7

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SPONTANEOUS EXCLUSION OF THE KIDNEY FROM CIRCULATION

$$\begin{array}{ccccccc} \text{BY CHAKLE} & \text{M HAKI} & \text{H K I} & \text{K I} & \text{M I} & \text{I A I} & \text{I} \\ & \text{I} & \text{H} & & \text{A} & \text{H} & \end{array}$$

May I think positively demonstrate that renal and ureteral lithiasis may entirely disappear a kidney in situ and at the same time exclude the organ completely. Such a kidney is entirely out of the ureter and is taken out in further treatment of the patient and ureter better out of the body than left in. If you will examine the specimen actually you will see the ureter is entirely excluded.

The part from whom the body was removed
 and the virgin mother and the child
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 N. 11 on August 4, 1885. She stated that the
 mother in the child was the same as the
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I received the notice Dr. Dall sent me
 by mail and I have the honor to reply
 to it by the same mode.

than a merely comfortable condition. Attacks will recur with lowered general resistance bad weather conditions etc.

Its first occurrence is, as a rule late after sexual life has terminated. There comes a gradual recognition of undue frequency of urination with tenesmus and burning. From time to time in its course the acute exacerbations may be severe and occasion much loss of sleep and worry resulting in distinct physical and mental impairment. Such sharp attacks may persist for weeks followed by months of comparative comfort. The urine at its worst may be clouded with mucus and pus, and occasionally though rarely blood stained. I have never seen a urine that was grossly thick and ropy with pus and mucus as we often see it in cystitis cases in younger individuals and in old prostatitis.

The bacteriological findings have been variable and in no way consistent. Staphylococci are practically always in evidence colon bacilli and allied forms occasionally, in one case a chain bacillus whose place in the nomenclature we never determined. Tubercle bacilli we have never found to be a factor in spite of the sometimes suggestive appearance. The smegma bacillus was almost invariably present unless excluded by care in procuring the specimen. In short in those cases that we have studied a determinative infection has not been identified. It may not be a specific infection and this is our belief but a condition developing after many differing bacterial onslaughts in bladders already weakened by the processes of senile decay. Again, many of the forms that we find may be saprophytic there as a result of favorable soil conditions rather than as causative factors.

One of our active workers along the lines of surgical pathology suggested that I might find these cases to be secondary to various degrees of prolapse following the lacerations and relaxations of pregnancy. He thought that the prolonged air and clothing contact with perversion of secretions would in part account for the senile vaginitis and that this might be the primary source of infection with the bladder condition secondary. Certainly in several of my more recent cases this

has not been true and I am skeptical of it as definitely etiological.

One of the illustrations here shown is an extreme case in an unmarried woman of sixty-four my only exception to the rule of the multipara. Here the vagina would only admit the little finger and there was nothing of relaxation or prolapse.

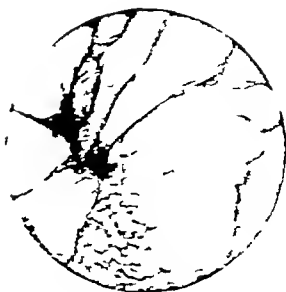
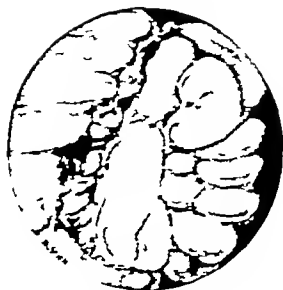
Often the bullous patches are sharply outlined in grouping from healthy perfectly normal bladder mucosa, as distinctly so as a Zoster eruption on the skin. This has suggested the possibility of its being akin to a recurrent chronic Herpes. Without going into lengthy discussion this theory hardly appeals to me as being adequate to explain the allied changes in the rectal and vaginal mucosae.

Almost without exception the condition is common to bladder, vagina, and rectum simultaneously. The clinical picture of senile vaginitis is so common that I shall not take time to comment on it except to say that it is always present and recognized that it most often receives all the attention and treatment for relief of the sometimes vague pelvic distress when it is only one of the trinity of troubles.

The vaginal change is usually looked upon as a shrinkage of subcutaneous tissues with atrophic disturbances in the epithelium and resulting painful erosions or even ulcerations. Add to this bacterial invasion with inflammatory exudates and the future course is not difficult of imagination. If this brief paragraph is true applied to senile vaginitis I believe it holds equally true of the accompanying bladder change and of the almost consistently present degeneration of rectal mucosa.

The vagina has not been included in the accompanying illustrations in spite of its invariable participation. I have presented however the rectal picture to accompany each bladder drawing. The rectal mucosa has varied in its appearance all the way from multiple punctate erosions to large distinct punched out areas of ulceration on an otherwise normal pink velvety base but still a darker ground shade than applies to a normal bladder.

At this point the question of syphilis might



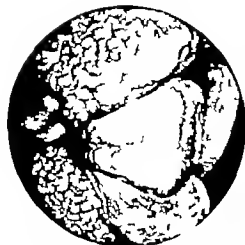


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(frontispiece) Greatly to my disappointment the appearance had entirely changed so that we were only able to get the interval picture with its apparent pigmentation of mucosa and increased network of vessels but no oedematous elevations or irregularities as seen previously. The rectal picture fails to show any of the lesions ordinarily found in these cases.

CASE 5. Mrs. McN., single, age 64. This is the only exception to my experience in this factor of childbirth but in as much as childbearing is regarded as only contributory, the explanations may be found more frequently than I have anticipated. Previous health only fair. Bladder symptom first appeared in February 1915 when he had a cystitis attack lasting three months. Since then he has had intervals of comfort.

A few of the vascular elevations have become purplular and one large clear bleb the size of a pea is apparent. The vagina and rectum both show advanced atrophic eroded areas.

Figure 8 (rectal) shows the same vascular lesion becoming purulent as found in the bladder. The artist has somewhat exaggerated the purulent character of these vesicles.

As suggested in an earlier paragraph the criticism may be offered that Fig. 8 is rather typical of tuberculosis. I admit the similarity but believe that during the coming summer months this bladder may be excised.

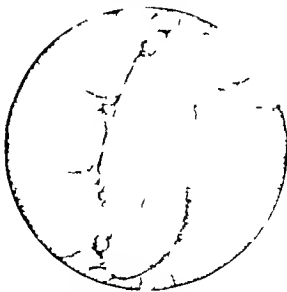


Fig. 8. Roentgenogram of the bladder showing a large, irregularly shaped mass, possibly a calculus or a large tumor. The mass is surrounded by a thin layer of tissue, and there are some smaller, more rounded masses visible within the main mass.

and will be found to correspond to Fig. 5 and 4. I have found this to be true in similar cases and bear in mind that this woman has had intervals of entire relief since the onset of her symptom and the history does not typically coincide with tuberculosis.

SPONTANEOUS EXCLUSION OF THE KIDNEY FROM CALCULI

By CHARLES M. HARPSTER, F.R.C. (M.D.), LACS. T. (D.O.)

Superior Toledo Hospital and Clinic, Toledo, Ohio

MY case I think positively demonstrates that renal and ureteral lithiasis may entirely destroy a kidney insidiously and at the same time exclude the organ completely. Such a kidney is entirely out of the urogenital system and is of no further use to the patient and surely better out of the body than left in. If you will examine the specimen carefully you will see the ureter is entirely occluded.

The patient from whom this kidney was removed was a female 37 years of age married and the mother of one child. She was referred to me by Dr. H. E. Noble, on August 4, 1915. She stated at the time of examination that she had had pain on her left side since her child was born about 12 years

ago. That for four or five years he had felt a mass on her left side which was gradually getting larger. For the last three or four months she stated she had had great pain at time of menstruation and that a large amount of pus was discharged from the vagina at time of menstruation. During the summer of 1915 had had spell of chills and fever and was compelled to remain in bed a part of the time. At times the pain in the left side was very acute and at other times would entirely disappear. The urine had been frequently examined and found free from any abnormal elements. During the period of her pregnancy the urinary symptoms were very marked and when voiding urine she had a bearing down burning pain. I made an examination of her urine and found it normal.

I referred the patient to Dr. Dolloway for an X-ray examination and I present the roentgenogram in which you will see the large calculus (Fig. 1).



Fig. Roentgenogram disclosing large calculus.

I catheterized the right ureter on August 6, 1905, and found no urine coming from the left kidney with catheter in the bladder and I was unable to pass catheter into the left ureter. The left kidney did not respond to any of the functional tests (phloridizin, phthalein indigo carmine). The right kidney was found to be normal.

A few days later I removed the specimen which is shown in Figs 2 and 3. The parenchyma of the kidney was as you see almost entirely destroyed. The cavity was filled with caseous mass. No tubercle bacilli were found on examination.

By operation the question arises whether we deprived the patient of a possible pus focus, since the organ had been spontaneously excluded by nature (Fig. 3). Perhaps only in so far as the ureter affected the vesical function could the presence of the organ have produced any clinical manifestations and even this is open to doubt. Buerger says:

Although this process of healing or exfoliation of the kidney (and, as it has also been termed, auto-nephrectomy) has been frequently noted as occurring in tuberculosis, it is not so well known that similar lesions may be the result of cerebral infection when the ureter has become obstructed for long time. So frequent is the development of the infectious type of lesion of the kidney when ureteral calculus is impacted for a long time that the

ureter that most of us will concede that total destruction of a kidney without pyonephrosis, without other manifestation of an infected pelvis or kidney parenchyma or without perirenal tissues is exceedingly rare.

It was our good fortune to obtain at an autopsy a specimen of a kidney and ureter which demonstrated conclusively that a kidney may be destroyed and excluded as it were in a silent fashion without giving any symptoms, when ureteral calculus or a ureteral calculus is impacted in the ureter for many years. In reviewing the literature but sparse mention of these facts could be found.

B. Rank in an article entitled "Concerning a Case of Healed Hydropyonephrosis" describes a case of infected hydronephrotic kidney which by virtue of an obstruction situated high in the ureter became converted into a sac filled with cheesy mortar like material. The kidney was obtained at an autopsy of a man who died of apoplexy. The foetal lobulations were fairly well marked by furrows separating many spherical protuberances the latter varying in size from a hazelnut to a walnut. Upon section the kidney which was hardly enlarged, was found filled with a cheesy mass of cement like consistency. The parenchyma was practically gone there being hardly any renal substance left except for remnants in the membranous walls and in the connective-tissue septa. Only at one point was there a small zone of tissue less than 1 cm in diameter. In short the specimen denoted the following pathological history: that a hydronephrotic sac had evidently become the seat of suppurative inflammation was thus converted into pyonephrosis, the purulent contents becoming finally changed into inspissated cheesy masses.

In discussing the causes of the hydronephrosis in this case the author concludes that the obstruction must have resided somewhere in the uteropelvic junction and inasmuch as no evidence of concretions or calculi were present he believes that either an inflammatory swelling of the mucous membrane or a calculus that had subsequently passed could have brought about the condition.

Vierteljahrsschrift für Praktische Anatomie, etc. Berlin, 1905, 15.



Fig. 3. Specimen removed from the patient.



Fig. 4. Specimen removed from another patient.

From a study of the author's report it seems to us most likely that the hydro-nephrosis could be best explained on the basis of an occlusion of the ureter by a calculus that had been arrested for a long time but had finally been expelled. The process of renal destruction as is seen in tuberculous of long standing where kidney tissue disappears and pseudocyst may form is often encountered where the calyx has become completely stenosed. With an obstruction of a calyx it is not frequent to see complete disintegration of the corresponding segment of the kidney and the conversion of the affected region into a sac filled with cheesy material or turbid fluid. In this way some of those cysts of the kidney may be accounted for the pathogenesis of which has given rise to so much comment and discussion. There

are those who doubt the existence of tuberculous cyst of the kidney. Hertz Boyer however describes two types of tuberculous cyst. First true cyst of the kidney in which epithelium covers the cavities and which coexist (renal tuberculosis) and secondly pocket which are the result of obstruction of a urinary passage of the kidney, as where a calyx is completely occluded. If the occluded zone is healthy a simple hydro-nephrosis is the result and contents of the cavity will be clear fluid. If on the contrary this area be the seat of a tuberculous process the cavity will become filled with cheesy material and this will become modified later on either into a putty like mass or it the material be absorbed into a fluid which contain some whitish particles and detritus.

DIVERTICULA OF THE URINARY BLADDER

By G. J. THOMAS, M.D., ROCHESTER, MINNESOTA
From the Mayo Clinic

THE frequent occurrence of diverticula of the bladder as observed in the urologic department of the Mayo Clinic has suggested a clinical study of the operative, non-operative, and post mortem cases since 1908.

Embryology. A review of the literature and textbooks of embryology as to the early development of the bladder is confusing. Many of the early writers are of the opinion that the anlage of the bladder is a differentiated portion of the allantois and is derived from this structure. Later writers, however, hold that the bladder is formed from the cloaca, a blind sac which is a dilated portion of the primitive gut caudal to the allantois. The cloacal membrane probably divides this sac into a ventral or large portion which becomes the urogenital sinus, and a dorsal smaller portion which becomes the rectum. Irenius (1) however from his dissections thinks that a saddle-like partition between the primitive gut and allantois grows caudally and divides the cloaca into dorsal rectum and a ventral primitive urogenital sinus. The partition thus made fuses with the cloacal membrane and divides it into the anal membrane of the gut and the urogenital membrane of the urogenital sinus. The mesonephric ducts which opened into the cloaca now open into this sinus. The buds forming the ureters spring from the mesonephric ducts near their insertion into the cloaca. As the urogenital sinus gradually becomes separated and differentiated from the rectum, certain absorptive changes take place in the proximal ends of the mesonephric ducts and primitive ureters. They become dilated and are taken up into the wall of the sinus, and as the absorption continues the ends of the ureters develop a separate opening and become separated from the ducts. The area between the ends of these two sets of ducts later becomes the point of division between a larger cephalic part of the sinus or the anlage of the bladder

and a smaller caudal portion which becomes the urethra.

Etiology. The etiology of these sacs from an embryologic standpoint can probably be explained as follows. The diverticulum so frequently seen around the meati may be anomalies of mesonephric duct buds which normally form the ureters etc. as Cabot and Binney pointed out from Huntington's case. Since portions of the wolffian ducts are taken up into the bladder and form a portion of it, anomalies of development may occur along the trigone and floor of the urethra as far as the ejaculatory ducts. The mucosa of the bladder is largely endodermal in origin except the trigone which together with the floor of the urethra is mesodermal. The failure of the urachus to close may account for some of the sacs at the roof of the bladder. These observations indicate that anomalies of embryologic development may at least predispose to the formation of these diverticula since most of them occur where fusion takes place between the different embryonic tissues. The location of the openings is most often in the areas where anomalies may be expected. The rôle that obstruction plays in the formation of these anomalies is not clear but clinically in a large percentage of cases it seems necessary for the development of symptoms.

Diverticula may be divided into two groups: congenital and acquired.

1. The congenital may be divided into (a) hour-glass bladder the strangulation may be above or below the ureters (b) double split or blind bladder. In this type the separation reaches to the apex of the trigone and both cavities open into a common urethra or a double urethra may be present.

2. The acquired type may be divided according to their etiology into (a) intra uterine (b) obstacles to urination (most frequent) and (c) traumatic.

The true congenital variety as observed



Fig. Small diverticula, probably congenital

ney containing stones was diagnosed from roentgen and cystoscopic findings. About one half inch anterior to the right ureter and toward the median line was another opening which could admit the end of the small finger. Upon observation, apparent spurts of fairly clear urine could be seen but these seemed to be synchronous with respiration. A catheter was passed with apparent ease and did not feel as if it coiled up. Argylol was injected into the bladder and a cysto-ureterogram was made. This showed a sausage-shaped shadow extending from the bladder to the bony pelvis of the right side where it was lost (Fig. 1). A had a passing catheter was passed into the right ureter which was found in a normal position and did not empty into or have any connection with the normal cavity. This patient had had a pelvic operation, which trauma of the bladder may have occurred and which might have been the etiologic factor in producing the same.

In the diagnosis of diverticula of the bladder in patients having suggestive symptoms Garratt (8) makes it a practice to distend the bladder with an opaque medium.

He believes that the diagnosis can easily be made by this means, and that it should be used routinely because in many instances cystoscopic findings are not positive.

In operating on a case of hour glass bladder Squier used two large clamps through the diverticulum opening and by resection between the clamps and stitching up the cut edges a large bladder or sac was made. He does not recommend this operation in all cases but thinks it applicable when the diverticulum is of the hour glass type.

In Young's (9) case in which there was a papilloma, he used a circular incision made from the vesical side surrounding the opening of the diverticulum. By blunt dissection the surrounding tissues were dissected off and it was necessary to remove a piece of the peritoneum. The peritoneum was closed through the vesical opening. This method is suggested by Young to remove diverticula and tumors which are situated on the posterior wall of the bladder and behind the ureteric openings.

Lower (10) suggested the introduction of a gauze strip into the sac to simulate a semi-solid tumor which makes its size easily seen and facilitates its removal. Edwin Beer (11) suggests the introduction of catheters into the ureters before operation is begun so that the ureters are easily found and constantly in view especially where transplantation is to be done.

Lerche (12) by means of a rubber bag attached to the end of a catheter and distended after introduction into the neck both increases the size of the diverticulum and makes resection easy. Lerche reports the following routes for radical operation:

- A Vaginal route
- B Sacral route
- C Suprapubic intraperitoneal
- D Suprapubic extraperitoneal

The various simpler methods which are used are:

- A Incision through the vaginal wall and drainage.
- B Establishing of fistula by sewing to the skin.
- C Peritoneal drainage behind bladder.
- D Peritoneal drainage of bladder.

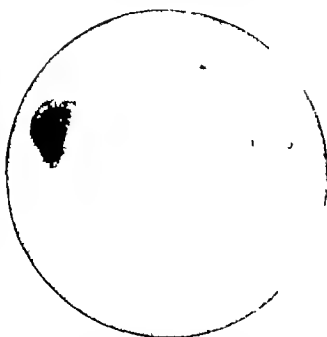


Fig. 2 Large diverticulum in the right wall with flattened shadow projecting in that of the bladder

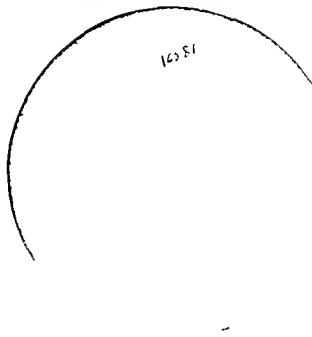


Fig. 3 Shadow showing a diverticulum which had been carefully injected with argyrol through a lateral catheter. Argyrol still in place in the bladder

E. Forceful stretching of the orifice of diverticulum

F. Curettement of mucous membrane of the diverticulum and suture of the latter without drainage

G. Invagination of diverticulum and bladder freshening of the margin of the orifice and closure intraperitoneally

H. Enlargement of the orifice of communication between the diverticulum and the bladder or a new anastomosis

I. Division of the walls of the bladder and diverticulum and suture of the cut walls

J. Suprapubic drainage

Engelisch (2) reports fifty-seven cases of diverticula up to 1904 in which there was perforation or rupture. He divides the cases that are most liable to perforation or rupture into four classes: (1) Chronic type with accumulation of pus and mucus; (2) acute suppurative; (3) ulcerating and gangrenous; and (4) perforating. In his opinion the location of the opening of the diverticulum in the bladder and its size are important factors entering into subsequent inflammation, perforation, etc.

In cases collected by Fischer there was a mortality in operative and non-operative

cases of 66 per cent in operative cases, 40 per cent and in non-operative of 84.5 per cent.

From January 1906 to November 1913, twenty-seven cases of diverticulum of the bladder have been observed in the Mayo Clinic. Fourteen of these patients were operated on, seven were not operated on, and six cases were found at autopsy. The average age of these patients was 51+ years, the youngest 18 and the oldest 73. The average age at onset of symptoms was 43+ years. Other than these numerous cases were observed which were regarded as false diverticula, probably the result of mechanical obstruction or inflammatory changes. These cases are not included in this report.

Previous diseases. Of these twenty-seven patients six (22 per cent) gave a history of urethral infection and two (7 per cent) had infection about the urethra associated with stricture. Five patients (18 per cent) had had previous operations, two for prostatic obstruction and three some operation on the bladder for drainage or exploration. Six (22 per cent) had trauma of the bladder, suprapubic area or of the perineum. The trauma to the perineum in two cases was the cause

of obstruction which preceded the symptoms. The four remaining patients gave good histories of onset of symptoms immediately following the trauma of the bladder.

Urinary symptoms. Difficulty of urination was present in nineteen instances (70 per cent) and was noted in eleven (40 per cent) as the first symptom. In nine there was retention and catheterization had to be resorted to before urine could be passed. In three there was incontinence. Frequency was a first symptom in nine (33 per cent) and was the predominate symptom in twenty-two. Hematuria was the first sign observed by the patient in two instances (7 per cent) while macroscopic blood was observed at some time during the history in eight (29 per cent). We were able to obtain a history of repeated urination from one patient only a symptom which has been frequently noted in published reports. In only two of our patients the symptoms began in childhood.

Clinical data. A suprapubic tumor was palpable in only three cases (11 per cent) in none was a flank or rectal mass observed. In eleven cases (40 per cent) a noticeable loss in weight was reported and this seemed to be the most common clinical finding. In six (22 per cent) the general loss of strength was graded as three on a scale of four.

Cystoscopic data. Cystoscopic examinations were made in nineteen of our patients. In sixteen (84 per cent) there was a marked degree of cystitis. In three (15 per cent) cancer was found in the bladder. In one case at post mortem a cancer was found in the diverticulum and was the cause of a perforation. Stones were found in the bladder in four (21 per cent) in one they were found with a cancer. There were three cases with multiple small stones in the diverticulum. Urethral stricture was noted in three (15 per cent) and was thought to be an etiologic factor in the production of the diverticula. In eight (42 per cent) the prostate was enlarged enough to cause obstruction to urination.

Location of opening of diverticulum. The opening of the diverticulum was found near the meati in six of the twenty-seven patients on the right side in two and on the left in

four. In six others the opening was found on the floor of the bladder in two near the urethra in four on the posterior wall in two in the dome in three the lateral walls were involved. In one an hour glass condition was found. In the three remaining cases the opening was on the posterior wall or base. In four cases there was more than one diverticulum. In thirteen cases generalized trabeculation of the bladder was present.

Röntgen-ray. A cystogram was made in sixteen cases ten showing positive findings. In our opinion a routine cystogram in suspected cases in which there is difficulty of urination not otherwise diagnosed either with or without the aid of the cystoscope will demonstrate a diverticulum in a large percentage of cases. Care must be taken in exposing the plates. Many shadows of diverticula are missed when the radiogram is taken in the ordinary anteroposterior position. Exposures should be made with the tube at different angles so that the shadow of the sac is not superimposed on that of the bladder. A coiled shadow-casting catheter or bougie will definitely outline a sac when shadow-casting fluids cannot be used. Care must be taken in the introduction of catheters into these sacs, and overdistention from injected fluids must be avoided because perforation of the diverticulum might occur (Figs. 2, 3, 4, 5 and 6).

Urinalysis. Pyuria was present in seven cases and gross blood was noted in three.

Medical treatment. Symptomatic treatment does not relieve patients of their symptoms and should be used only when surgical measures are contra-indicated. Temporary relief is sometimes obtained but recurrence is rare.

Surgical treatment. In fourteen cases some type of operation was performed. In six the diverticulum was resected. The extraperitoneal operation was done four times and the intraperitoneal two. A preliminary drainage was done in two cases preparatory to a resection. In six instances a drainage operation only was done or the diverticular opening was enlarged. In one case a septum was removed and in one a diverticulum was

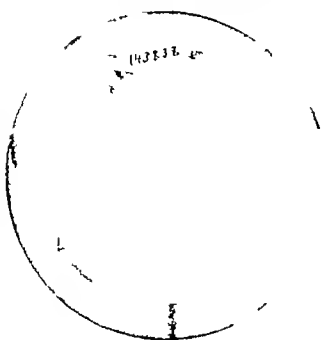


Fig. 4 Multiple diverticula in the lateral wall of the bladder

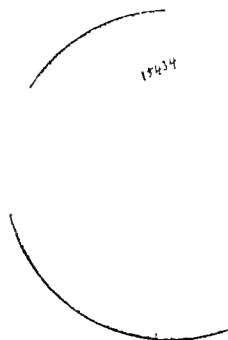


Fig. 5 Multiple diverticulum in the lateral wall of the bladder

dissected loose and its opening enlarged so that the drainage was improved or complete.

Complications. In three instances cancers were removed; one occurred with an hour glass contracture of the bladder; the mass in the upper chamber. Stones were removed in three patients; two having stones in the diverticula. It was necessary to remove the prostate in six instances. The prostates all proved to be benign. Dilatation of the ureter was found in one. In only one case was there evidence of perforation or of peritonitis.

This occurred in a man of 60 years who came to the Clinic complaining of a long standing skin trouble. For a number of years he had slight difficulty with urination and was quite sure that he was not emptying his bladder. He was in very poor physical condition and a complete examination was not made. Urinary difficulty became so troublesome that he was confined to his bed. He had a sudden attack of pain in the lower abdomen, increase in temperature and pulse rate and collapse. He seemed to pass a fair amount of urine and catheterization was not done for fear of precipitating an attack of uræmia which was the tentative diagnosis. He died in 4 or 5 days before a positive diagnosis had been made. At autopsy a moderate degree of hypertrophy of the prostate together with three diverticula were found. One of the diverticula had ruptured because of a cancer which it contained. The diverticulum was situated along the posterior wall of the bladder.

Evidence of peridiverticulitis with resultant adhesions was present in every patient. The difficulty of removal in most instances made a careful examination of the diverticulum impossible. In three patients persistent post-operative fistula developed which did not heal for several months. Pyelonephritis was a complication in four; stone with pyonephrosis in one. In one instance only did the ureters open into the diverticula and the condition was bilateral.

Mortality. In the six cases in which resections were done there were no deaths. One of these patients died some weeks after leaving the hospital probably from acute renal infection. Two patients had drainage preparatory to resection; one of these died. One other had a carcinoma in an hour glass bladder and died after suprapubic drainage. In one case in which there were large stones in an enormously distended bladder with a diverticulum the patient died from the effects of suprapubic drainage. In six instances a diverticulum was discovered at autopsy; one of these patients had had a severe renal infection; one had had a few pus-cells in the urine; in the remaining cases there were no urinary findings. These patients did not have symptoms which could make a diagnosis of

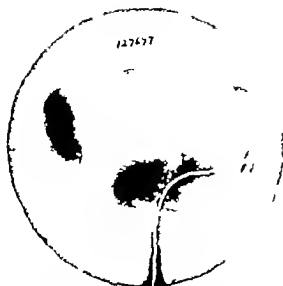


Fig. 6 Shadow casting catheter carefully coiled in diverticulum the left lateral wall of the bladder

diverticulum probable except the one with renal infection. In the cases complicated by carcinoma, stones or severe renal infection, the mortality is high.

Post mortem findings. A review of the post mortem findings shows some interesting facts. Marked pyelonephritis was found in 80 per cent and was considered the major factor in causing death. A severe grade of nephritis was found in 78 per cent. In 55 per cent there had been severe cystitis and in two the inflammation in the diverticulum was more marked than that in the bladder. Two patients died of pneumonia.

CONCLUSIONS

1. The embryology of the bladder is not clear and in only a few cases does incomplete development account for the pathology. In some instances the condition may be congenital but other factors seem necessary before symptoms develop.

2. In this group the average age of onset (43+ years) would indicate that acquired factors (obstruction 86 per cent) seem necessary for the development of diverticula clinically.

3. Trauma was a factor in 22 per cent.

4. The cystogram and shadow catheter are of great aid in diagnosis and may be the only positive findings.

5. Surgery is the best method of treatment. The choice of operation depends on the location and size of the diverticulum.

6. When resection is possible the mortality is negative. In complicated cases the mortality is high because of renal and vesicle infection.

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THE TREATMENT OF GENITAL TUBERCULOSIS IN THE MALE¹

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THE material upon which this communication is based is from the post mortem and clinical data of the Boston City Hospital, the Long Island Hospital, where there is a large tubercular camp, private cases, and a survey of the literature.

Post mortem findings have been included first because examinations at autopsy are more accurate than clinical observation, and serve to establish the frequency of co-existing tubercular lesions in the different structures of the genital tract, second because it is frequently impossible to detect clinically the presence of tubercular lesions in the prostate and vesicles when tuberculosis of the epididymis is obvious, third because in tubercular epididymitis it is of great importance to know the probability of similar lesions in the other organs of the genital tract when they are apparently normal by every means of clinical examination, fourth it is of great value to know the frequency with which renal and vesical tuberculosis is to be expected together with tuberculosis of the epididymis, and fifth it is possible by post mortem examination to learn how frequently other organs, such as the lung, bone, etc., are tubercular also. Such information it seems to me must be the groundwork upon which our inaccurate clinical methods of observation stand, and it is from the actual knowledge or if not actual knowledge, the likelihood of the presence of the infection in the remainder of the tract that appropriate treatment should be based.

Autopsy findings. In 45 autopsies recorded I have been able to find 35 instances of *tuberculosis of the epididymis*, the most common lesion of the genital tract to be observed clinically, in which a microscopical examination as well as a gross description of the condition of the prostate and vesicles is recorded. Of these 35 cases the disease was bilateral in the epididymis in 15, and in 20 it was unilateral—right 12, left 8. In these 35 cases the vesicles were involved in 25, and the pros-

tate in 25. It is seen that in each instance where the vesicle was involved the prostate was involved also, and that there were 10 instances where the epididymis was the only structure of the tract affected, which gives good reason for the belief that the disease is usually primary in this organ. Of the 15 bilateral cases involvement of the seminal vesicles was bilateral in 11 and unilateral in 4. Of these 35 cases the testicle was involved in 19. In 4 of the cases involving the epididymis, vesicles, and prostate with a caseous tuberculosis there was an acute miliary tuberculosis of all the visceral organs which was the probable cause of death. In all of the other cases the primary cause of death was other than tuberculosis of the genital organ. In many of these instances of tuberculosis of the epididymis just mentioned the lesions in the prostate or vesicle were not, and in fact could not be detected by rectal palpation, because in some it was only on microscopical examination of the tissues that the lesion were detected.

Of these 35 cases the bladder was involved 16 times and the kidney showed unilateral tuberculosis in 11 and bilateral infection in 5. Tuberculosis of other structures occurred as follows: lung, 31; bone, 5; intestines, 8; ischio-rectal abscess, 3; some of the cases showing multiple lesions. In this series of 4250 autopsies there were two instances of caseous tuberculosis of the prostate without involvement of the vesicles or epididymis. In one there was no other focus of tuberculosis in the body, except in the lung, and in the other both kidneys and the bladder were tuberculous, and at the same time there was a lung focus.

Clinically. an analysis of the cases of tubercular epididymitis serves to substantiate the post mortem findings in some degree, but the discrepancies in demonstrating the high relative co-existence of the disease in the different organs of the whole tract, from the clinical data to follow must be attributed as previously stated to the inability to dem-

onstrate the lesions clinically as frequently as they exist.

Of 86 patients showing a tubercular epididymis, where the records are satisfactory, 41 showed palpable lesions on the vesicles and 49 in the prostate while 37 showed no palpable lesions in the vesicles or prostate.

In many of the instances where the vesicle and prostate were typically tubercular smears of the material expressed from them showed the tubercle bacillus in less than 15 per cent of the cases examined.

Of these 86 clinical cases the bladder and kidneys were examined in 51. The bladder was tubercular in 16, there was unilateral renal tuberculosis in 9 and bilateral in 5 and in 2 no renal tuberculosis could be demonstrated. In three cases there was a tuberculosis of the hip and 5 had Pott's disease, one had tuberculosis of the shoulder joint and 67 had distinct signs in the lungs.

A consideration of the literature both post mortem and clinical adds further evidence which lead one to the conclusion that tuberculosis of the genital tract in the male is most common in the epididymis where it is often primary occurring as a hematogenous infection and from the epididymis the disease extends along the vas, either by continuity or lymphatics to the vesicles and prostate. Walker in his remarkable monograph *Studies in the Experimental Production of Tuberculosis in the Genito-urinary Organs* states that secondary tuberculosis of the vesicles occurs in about 60 per cent of all the cases of genito-urinary tuberculosis and as shown in my post mortem findings when the vesicles were involved the prostate was involved also (25 out of 35 cases).

There is much evidence to support this view. Simmonds found in a series of 35 cases of genital tuberculosis that the vesicles were infected in 29 and the prostate in 26. Oppenheim in a series of 27 cases found the vesicles invaded in 17 and the prostate in 18. Krzywicki in a series of 15 cases showed the vesicles tubercular in 11 and the prostate in 14. Collinet in a series of 70 cases found the vesicles involved in 36 and the prostate in 44. Saxtorph, in a series of 547 instances of genital tuberculosis found at autopsy records

but two instances where the only demonstrable lesion was in the vesicles and 9 cases where the only lesion was in the prostate. Teutschlaender in a series of 57 cases found but a single example of tuberculosis confined to the vesicles. Guys in a series of 183 cases of genital tuberculosis found 10 involving the prostate and vesicles alone. Socin and Burchardt record 44 clinical cases of genito-urinary tuberculosis and found no instance where but single structure was involved.

The question of whether tuberculosis occurs as a primary lesion in the prostate or vesicles as far as the genital tract is concerned is of only passing interest. As regards the prostate it must be considered extremely rare but an autopsy record by Crandon and two by Krzywicki and the two cases in my series show that the prostate may rarely be the only organ of the genital tract to be infected. In regard to the vesicles the autopsy findings of Saxtorph, Teutschlaender, Oppenheim, Orth, Dreyer and others must lead to the belief that this structure may be the only one of the tract to harbor tuberculosis yet the vesicles, like the prostate are usually infected from a tubercular process in the epididymis or kidney. From this evidence it is not to be presumed that when the vesicles give clinical signs of a tubercular process, these structures are the only part of the genito-urinary tract involved.

It may be safely concluded therefore from the post mortem and clinical data that when tuberculosis is present in the epididymis there are tubercular lesions in the vesicles and prostate in most instances whether they can be demonstrated clinically or not.

Treatment. It is upon this well founded assumption that treatment should be based. There are those who recognizing lesions in all the different organs of the tract recommend and have practiced a total removal of the genital tract. On the other hand there are those who recognizing the same condition advocate no surgical procedure but rely on general hygienic measures, symptomatic treatment and tuberculin. Between these two extreme points of view we have

those who advise simple drainage of tubercular abscess or removal of the scrotal lesion either by epididymectomy or castration leaving the disease in the vesicles and prostate kidney and bladder as the case may be to be taken care of by reliance upon the improvement in general condition after the removal of the scrotal focus followed by employing hygiene tuberculin or both to immunize the individual against further outbreaks of the disease. As has been pointed out tuberculosis of the upper urinary tract may be associated with the genital tuberculosis in some instances and a knowledge of the condition of the bladder and kidneys should be ascertained if possible by cystoscopy ureter catheterization and renal function tests before the method of treatment should be decided upon and if a complete examination of the upper urinary tract is impossible at least a catheter specimen should be subjected to urinalysis and bacteriological study. It is obvious that a complete knowledge of the individual case is of value in prognosis and must influence the course of procedure in the treatment. Naturally a patient with tuberculosis of the whole genito-urinary tract or advanced phthisis should not be treated surgically except in a palliative way.

Before proceeding to elective surgical operations upon the genitals it is essential to have besides a complete knowledge of the genito-urinary system the evidence furnished by a general physical examination for it has been shown that tuberculosis of the urogenital system is always to be considered secondary to a tubercular process elsewhere in the body. It is only upon a complete knowledge of the individual case that appropriate treatment can be instituted.

It must be clear that the problem of treatment must be considered as one of immunization for with the presence of tubercular foci in different organs of separate system of the body no surgical procedure can entirely free the patient of the disease as such. All evidence in regard to the surgical treatment of tuberculosis points to but one conclusion namely that surgical treatment does not in itself fulfill all the indications and

localized tuberculosis in the genital system as elsewhere should therefore not be considered as a purely surgical problem but rather that surgery may be a valuable method of freeing the bodies of accessible foci that the natural immunizing function of the body may be improved and other immunizing measures may be more effective.

In regard to what may be expected from surgery as applied to genital tuberculosis there is no report as complete as that by Barney. He has shown from a study of 154 cases of genital tuberculosis at the Massachusetts General Hospital that tuberculosis was demonstrated clinically in other part of the body in 55.8 per cent of the cases (lungs 35 cases kidney 7 cases bones 7 cases). Of these 154 patients he was able to trace 113 and found that 31 died of tuberculosis and 8 from other causes. Of the 31 patients dying of tuberculosis 15 developed signs of tuberculosis elsewhere in the body following operation. Of these 31 cases 4 or 14.2 per cent died in the hospital within a month after operation 9 or 32.1 per cent died within 6 months and that within one year 50 per cent had died. At a period of six years after operation 8 per cent had died.

The results obtained by the attempt to remove the whole genital tract are not at hand except those of Whiteside's who in 1914 reported 22 cases of removal of the whole or one half of the genital tract that is the testicle with the epididymis the vas seminal vesicles and prostate. In that series he considered 4 cured 9 died or phthisis (time after operation not stated) 3 died within a few months from local infection 6 were lost sight of presumably they may be dead. There was no operative mortality. The time required to do the operation was about three hours.

Personally I have recognized the advantages of a total extirpation of the genital tract in suitable cases because of the associated tubercular lesions in other parts of the genital system yet the technical difficulties entailed in performing this operation several times upon the cadaver have kept me from employing it in the living.

The most complete report of cases followed

for many years, that I can find is by Haas. He records the results of the Tuebingen clinic of Bruns, which follows 111 patients, upon whom either single or double castration had been performed were examined at periods subsequent to the operations varying from three to thirty years. In 78 of the cases one testicle, and in 33 of them both testicles were removed. The vas was divided high up in all cases. In 26 per cent only of the unilateral castrations did the disease appear in the other testicle later but 9 per cent of the same patients died of tuberculosis of the urinary tract. Most of the latter number had shown evidence of tuberculous disease of other parts of the tract previous to the operations. Cure followed the unilateral castrations in 44.6 per cent of the cases. Of the 33 patients who were submitted to double castration 56 per cent were cured, 15.6 per cent died within the first three years after ward from genito-urinary tuberculosis in some form or other. The mortality therefore, of complete castration within the first three years after the operation was nearly twice as great as that seen in connection with the unilateral operation in the same period but, on the other hand, the percentage of cures among the patients upon whom complete castration had been performed and who survived more than three years after ward, was noticeably greater.

The procedure of removing the scrotal focus, either by epididymectomy or castration with subsequent hygienic treatment, and in recent years by employing tuberculin is today the most common practice. Barney's report, the most recent and complete in regard to end results, showing a mortality of 85 per cent within six years following such procedures in an institution of the highest surgical efficiency is far from satisfactory.

There is much evidence in support of the benefit which may be expected by the employment of hygiene and tuberculin. I have recently examined several cases who have been under the care of Dr. George Sanborn, director of the Department of Vaccine and Serum Therapy at the Boston City Hospital. I am convinced that much benefit has resulted in the cases which have been treated

by tuberculin subsequent to the removal of local genital foci and there are two cases with which I have been personally familiar that from all objective and subjective signs may be considered free from tuberculosis in the genito-urinary tract without any previous surgical procedures. One is a young man seen in 1907 by Dr. John T. Bottomley. A diagnosis of tuberculosis of the right kidney was made by ureter catheterization and inoculation tests, and there was a characteristic unilateral genital tuberculosis. An abscess developed in the scrotum from which the tubercle bacillus was isolated. After 18 months treatment by tuberculin the symptoms were entirely absent and two years ago 1914 inoculation tests of the urine were negative.

Another case a man 24 years old had a unilateral genital tuberculosis resulting in abscess formation in the scrotum. After 6 months treatment with tuberculin the wounds were healed and there were no subjective symptoms. This patient was seen on March 26 1916. The testicle and epididymis were practically destroyed leaving a small fibrous body. There was a hard nodule in the left lobe of the prostate and the left vesicles had somewhat thickened walls but not enlarged. The material expressed was not abnormal and inoculation tests of the urine were negative, and no organisms could be found in smears. There are many other cases who have received the same sort of treatment in which the results are not so brilliant, yet I am convinced that this form of treatment is a great adjunct to surgical measures and should form the after treatment in all operative cases and the chief feature in non-operative cases.

Being convinced of the greater advantages to be gained by eliminating the disease from the structures in the genital tract above the epididymis, and yet being fearful of a radical surgical procedure which attempts to wholly eradicate the disease because of the difficulties dangers and failures, I have chosen to attempt to remove the disease from the vas, vesicles, and possibly the prostate by performing epididymectomy or castration infecting the vas with crude carbolio acid and later employing hygiene and tuberculin. The

idea of this form of treatment was suggested by Belfield's paper entitled Irrigation and Drainage of the Seminal Ducts and Vesicles Through the Vas Deferens in which he advocated treatment of the infected vesicles by injections through the vas deferens and from the results of the treatment of the tubercular ureter by the injection of carbolic acid following nephrectomy as practiced at the Mayo Clinic.

The number of cases subjected to this method of treatment in which the results are known is 32. In 14 lesions of the epididymis alone could be demonstrated prior to operation. In 18 lesions of the vesicles were present and in 15 lesions of the vesicles and prostate also were evident. In 5 patients the lesions in the epididymis were bilateral. Three patients had tuberculosis of the bladder and unilateral renal tuberculosis. No cases with bilateral renal tuberculosis were subjected to epididymectomy or castration and are not considered in this report. Twenty-three had phthisis and 2 had tuberculosis of the bone. Thirteen were subjected to unilateral epididymectomy, 2 to bilateral epididymectomy, 1 epididymectomy on one side and castration on the other, 14 were subjected to unilateral castration because the disease involved the testicle and 2 bilateral castration. 3 had a subsequent epididymectomy for recurrent disease and 4 had a subsequent castration for recurrent disease, 1 had a subsequent nephrectomy and 2 had previously had a nephrectomy for tuberculosis. I have previously mentioned a case of tubercular epididymitis on one side and a gonorrhoeal epididymitis on the other. The tubercular epididymis which was removed showed both a tubercular and gonorrhoeal infection. Of these 32 patients 7 are known to have died. The following table shows deaths by year and causes.

Year	Post-operative	Number of cases	Per Cent	Remark
1914	0 to 6 months	1	1	Nervous breakdown Suicide
1915	0 to 6 months	1	1	Post-operative nephritis
1916	6 to 12 months	1	1	Phthisis-cultured tuberculosis
1917	12 to 18 months	1	1	Phthisis-urine neg. tv
1918	18 to 24 months	1	1	Phthisis-urine neg. tv
1919	24 to 30 months	1	1	Phthisis-urine neg. tv
1920	30 to 36 months	1	1	Phthisis-urine neg. tv
1921	36 to 42 months	1	1	Phthisis-urine neg. tv
1922	42 to 48 months	1	1	Phthisis-urine neg. tv
1923	48 to 54 months	1	1	Phthisis-urine neg. tv
1924	54 to 60 months	1	1	Phthisis-urine neg. tv
1925	60 to 66 months	1	1	Phthisis-urine neg. tv
1926	66 to 72 months	1	1	Phthisis-urine neg. tv
1927	72 to 78 months	1	1	Phthisis-urine neg. tv
1928	78 to 84 months	1	1	Phthisis-urine neg. tv
1929	84 to 90 months	1	1	Phthisis-urine neg. tv
1930	90 to 96 months	1	1	Phthisis-urine neg. tv
1931	96 to 102 months	1	1	Phthisis-urine neg. tv
1932	102 to 108 months	1	1	Phthisis-urine neg. tv
1933	108 to 114 months	1	1	Phthisis-urine neg. tv
1934	114 to 120 months	1	1	Phthisis-urine neg. tv
1935	120 to 126 months	1	1	Phthisis-urine neg. tv
1936	126 to 132 months	1	1	Phthisis-urine neg. tv
1937	132 to 138 months	1	1	Phthisis-urine neg. tv
1938	138 to 144 months	1	1	Phthisis-urine neg. tv
1939	144 to 150 months	1	1	Phthisis-urine neg. tv
1940	150 to 156 months	1	1	Phthisis-urine neg. tv
1941	156 to 162 months	1	1	Phthisis-urine neg. tv
1942	162 to 168 months	1	1	Phthisis-urine neg. tv
1943	168 to 174 months	1	1	Phthisis-urine neg. tv
1944	174 to 180 months	1	1	Phthisis-urine neg. tv
1945	180 to 186 months	1	1	Phthisis-urine neg. tv
1946	186 to 192 months	1	1	Phthisis-urine neg. tv
1947	192 to 198 months	1	1	Phthisis-urine neg. tv
1948	198 to 204 months	1	1	Phthisis-urine neg. tv
1949	204 to 210 months	1	1	Phthisis-urine neg. tv
1950	210 to 216 months	1	1	Phthisis-urine neg. tv
1951	216 to 222 months	1	1	Phthisis-urine neg. tv
1952	222 to 228 months	1	1	Phthisis-urine neg. tv
1953	228 to 234 months	1	1	Phthisis-urine neg. tv
1954	234 to 240 months	1	1	Phthisis-urine neg. tv
1955	240 to 246 months	1	1	Phthisis-urine neg. tv
1956	246 to 252 months	1	1	Phthisis-urine neg. tv
1957	252 to 258 months	1	1	Phthisis-urine neg. tv
1958	258 to 264 months	1	1	Phthisis-urine neg. tv
1959	264 to 270 months	1	1	Phthisis-urine neg. tv
1960	270 to 276 months	1	1	Phthisis-urine neg. tv
1961	276 to 282 months	1	1	Phthisis-urine neg. tv
1962	282 to 288 months	1	1	Phthisis-urine neg. tv
1963	288 to 294 months	1	1	Phthisis-urine neg. tv
1964	294 to 300 months	1	1	Phthisis-urine neg. tv
1965	300 to 306 months	1	1	Phthisis-urine neg. tv
1966	306 to 312 months	1	1	Phthisis-urine neg. tv
1967	312 to 318 months	1	1	Phthisis-urine neg. tv
1968	318 to 324 months	1	1	Phthisis-urine neg. tv
1969	324 to 330 months	1	1	Phthisis-urine neg. tv
1970	330 to 336 months	1	1	Phthisis-urine neg. tv
1971	336 to 342 months	1	1	Phthisis-urine neg. tv
1972	342 to 348 months	1	1	Phthisis-urine neg. tv
1973	348 to 354 months	1	1	Phthisis-urine neg. tv
1974	354 to 360 months	1	1	Phthisis-urine neg. tv
1975	360 to 366 months	1	1	Phthisis-urine neg. tv
1976	366 to 372 months	1	1	Phthisis-urine neg. tv
1977	372 to 378 months	1	1	Phthisis-urine neg. tv
1978	378 to 384 months	1	1	Phthisis-urine neg. tv
1979	384 to 390 months	1	1	Phthisis-urine neg. tv
1980	390 to 396 months	1	1	Phthisis-urine neg. tv
1981	396 to 402 months	1	1	Phthisis-urine neg. tv
1982	402 to 408 months	1	1	Phthisis-urine neg. tv
1983	408 to 414 months	1	1	Phthisis-urine neg. tv
1984	414 to 420 months	1	1	Phthisis-urine neg. tv
1985	420 to 426 months	1	1	Phthisis-urine neg. tv
1986	426 to 432 months	1	1	Phthisis-urine neg. tv
1987	432 to 438 months	1	1	Phthisis-urine neg. tv
1988	438 to 444 months	1	1	Phthisis-urine neg. tv
1989	444 to 450 months	1	1	Phthisis-urine neg. tv
1990	450 to 456 months	1	1	Phthisis-urine neg. tv
1991	456 to 462 months	1	1	Phthisis-urine neg. tv
1992	462 to 468 months	1	1	Phthisis-urine neg. tv
1993	468 to 474 months	1	1	Phthisis-urine neg. tv
1994	474 to 480 months	1	1	Phthisis-urine neg. tv
1995	480 to 486 months	1	1	Phthisis-urine neg. tv
1996	486 to 492 months	1	1	Phthisis-urine neg. tv
1997	492 to 498 months	1	1	Phthisis-urine neg. tv
1998	498 to 504 months	1	1	Phthisis-urine neg. tv
1999	504 to 510 months	1	1	Phthisis-urine neg. tv
2000	510 to 516 months	1	1	Phthisis-urine neg. tv

Of this series of 32 patients the urine has recently been studied in 25 these being alive at the present time and no evidence of genital tuberculosis is to be found in 21. One has tubercular lesions in the bladder and prostate five years after unilateral castration and is one of the cases in which a nephrectomy was done. One has bilateral renal tuberculosis 7 years after operation and two have tubercular lesions in the prostate and possibly the vesicles one four years and one three years after operation. Of the remaining 21 cases there is no evidence of the disease in the local examination the urine is negative and smears of the massage fluid from the prostate and vesicles is negative in each instance. In but one patient was the inoculation of urine into guinea pigs positive and this case had a right castration in December 1914 and a left February 1915. The urine is negative by urinalysis and the smears negative. This patient is in excellent health and the inoculation findings were a surprise.

To summarize: Of these 32 cases 7 or 21.7 per cent have died in 10 years 25 or 88.3 per cent are living, 4 have demonstrable tuberculosis in the genito-urinary tract, 1 has no demonstrable tuberculosis but the inoculation test is positive, 20 or 62.5 per cent are locally free from the disease.

The operative technique is briefly as follows. The patient comes to the operation with at least one hour's urine in the bladder or if the bladder is empty about 4 ounces of water is injected. After performing epididymectomy or castration the vas is injected with a drachm of crude carbolic acid by means of a syringe fitted with a metal tip usually employed to make injections into a ureter catheter. The vas is brought to the surface of the skin through a stab wound above the scrotum and held by a catgut suture the lumen being unobstructed. The scrotal wound is closed with or without drainage as the case may indicate and an alcohol dressing applied to neutralize any of the carbolic acid which may escape. The urethra is washed out to remove any carbolic acid which may have escaped into it but as a rule the acid runs back into the bladder and is diluted by the bladder fluid.

Upon recovering from the operation the patient usually voids early as the irritation from the carbolic acid is evident, and because the bladder contains fluid at the time of operation. In a few instances the patients have required catheterization.

Pain during the first few days after operation is often considerable requiring liberal doses of morphia yet some patients have had little or no pain. In a few micturition has been so frequent and painful that an indwelling catheter has been necessary and several patients have passed blood in small amounts, mixed with the urine for a few days to a fortnight. There is rarely "vesicle colic" and rectal irritation, and the urine may contain much detritus for many weeks. There has been no evidence of carbolic acid poisoning.

The reaction from this method of treatment, while severe in some cases, is slight or absent in others and whatever immediate discomfort there may be is of only passing interest if we can free the genital tract of so severe a disease.

The examination of the vesicles and prostate months following operation usually shows the vesicles to be small fibrous bodies if palpable at all and the prostate sometimes quite normal but often sclerotic and the material expressed by massage is small in amount. In no instance has the massage fluid following operation shown the tubercle bacillus in smears, and in no instance has a contracture taken place in the urethral canal.

Following the healing of the wound and the subsidence of any febrile state the patients have been given tuberculin, the dose being at first small and gradually increased. The general hygienic measures, commonly employed in tuberculosis, are insisted upon and carried out indefinitely.

CONCLUSION

1. The post mortem and clinical findings show that the great majority of cases of genital tuberculosis have active tuberculosis elsewhere in the body the infection in the genito-urinary tuberculosis being a secondary infection

2. It must be considered that the majority of cases of tubercular epididymitis have tuberculosis of the vesicles and prostate on the corresponding side, whether the condition can be demonstrable by physical examination or not.

3. Cases of genital tuberculosis often have associated tuberculosis of the bladder and kidney and a cystoscopic examination with catheterization of the ureter should be a routine procedure in each case before the possibility of such associated infection can be eliminated.

4. In the opinion of the writer the best treatment for the local condition in most instances, is to remove the scrotal focus by epididymectomy or castration, and this should be followed by injecting the vas with a drachm of crude carbolic acid, with the hope of eradication of the disease from the genital tract.

5. That the destruction of the local focus by this procedure is but the first step in the process of immunizing the patient against fresh outbreaks of the disease and that hygienic and tuberculin should be made use of indefinitely as they serve further to aid, in a rational way the immunizing power of the body against remaining lesions.

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THE TREATMENT OF THE FATTY CAPSULE AND THE URETER IN NEPHRECTOMY FOR RENAL TUBERCULOSIS

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IN a consideration of the surgical treatment of renal tuberculosis two facts stand out prominently (1) the present status of the question relative to the diagnosis and treatment of renal tuberculosis (2) the fact that the management of the fatty capsule and the ureter has not been a definitely settled as has the former.

With reference to the first topic I should like to refer to Cabot's introduction to a recent article on this subject in which I think he sums up the question of diagnosis and treatment as well as it can be. Though many points connected with the diagnosis and treatment of renal tuberculosis have been practically settled during the past ten years much still remains to be done. In expert hands the questions of diagnosis have been well cleared up and the formerly much discussed question of the advisability of surgical treatment has ceased to play an important part. The tendency to watchful waiting which was generally but another name for medical procrastination has considerably abated and there is practically no difference of opinion among those qualified to express one that in unilateral renal tuberculosis

operation offers the only chance of cure and the so-called medical treatment only prolongs the agony.

When however our attention is directed to a consideration of the management of the fatty capsule and the ureter in nephrectomy for renal tuberculosis one finds a great many different expressions of opinions somewhat analogous to the unsettled and chaotic condition which the entire question of surgery of kidney tuberculosis was in ten years ago. Because of these facts one is justified in stating that the question of treatment of these two structures is not as definitely settled as are the questions of diagnosis and treatment.

Until comparatively recently the fatty capsule has been either ignored or sadly neglected. Many of our standard textbooks do not refer to it at all. Just why it should have been overlooked is not clear. Many of the more recent writers attribute to it the possibility of its being one of the causes of post-operative sinus formation after nephrectomy and that not all of the post-operative fistule or sinuses are due to the ureteral stump. A consideration of the fatty capsule as a factor in the production of fistule

or of an infection of the wound by tuberculosis cannot be undertaken without reference to the lymphatics.

The most extensive work on the lymphatics of the kidney and its capsule has been done by Stahr. He has shown that there are two capillary networks within the fatty capsule of the kidney. A coarser network which lies under the peritoneum, superficially in the fatty capsule. A second capillary network lies in the deeper layers of the fatty capsule close to the kidney substance. This is a delicate network and according to Stahr is in direct communication with the lymph capillaries of the kidney cortex. By injection preparations he was able to demonstrate that the kidney possesses a rich network of lymphatics. *The different lymphatics leave the kidney at the hilus but in spite of this he has demonstrated that a lymphatic connection exists between the lymphatics of the kidney and its capsules.*

These anatomic facts are of much importance in a consideration of the treatment of the fatty capsule. If we accept Stahr's work as having proved that this lymphatic connection exists, then it is reasonable to expect that in all, or in the largest majority of cases, the fatty capsule must sooner or later become infected. The possibility of the fatty capsule becoming infected in each case naturally brings up the question of whether or not it is proper to remove it as a routine in every case.

Clinical evidence of involvement of the fatty capsule is seen in some of the late cases in which at the time of operation the fatty capsule can be recognized as being definitely pathological. Schlaginweit, in one of his cases found a pathologically altered and enlarged lymph-node about the size of an almond, in the fatty capsule.

Legueu maintains that the fatty capsule is almost always changed, indurated and more or less adherent to the kidney. Sometimes the lesions are purely inflammatory but they are generally tuberculous, and many authors have demonstrated specific lesions in them (Israel Albarran, Pousson Kapsammer Kidd).

Tuberculosis of the fatty capsule may be evident in cases where tuberculous granula-

tions are seen on the surface of the kidney. Not only are tuberculous changes found in cases in which the fatty capsule appears altered to the naked eye but they have also been found in cases in which the fatty capsule appeared perfectly normal. Legueu has demonstrated microscopic tubercles in the perirenal fat, in pieces of the fatty capsule taken at random from areas that appeared normal to the naked eye.

These facts would appear to be rather conclusive evidence in favor of a removal of the perirenal fat, or as much of it as possible in cases of nephrectomy for tuberculosis. Albarran believed that the course of the disease was shortened by secondary removal of the fatty capsule. However Schlaginweit, holds opposite views in his first nine or ten nephrectomies he removed the fatty capsule with a great deal of trouble and loss of time but since then he has left it in place. He believes that if the fatty capsule is normal soft, and does not contain any palpable glands it does not do any harm. If it is hard and rigid, it has formed a protective wall before the operation and will continue to do so afterward. Recommendations to remove the fatty capsule have been made by Kuester Koenig and Pels Leodsen Kidd Wildholz Kelly Watson and Cunningham, and others.

During the past three years I have made it a routine procedure to remove as much of the fatty capsule as possible. This was carried out after the kidney was removed. In cases in which there has been a good deal of perinephritis, with extensive thickening of the fatty capsule so that extensive adhesions are present, rendering the removal dangerous it may be necessary to forego its removal. The danger of injury to the peritoneum with resulting tuberculous peritonitis is obvious.

THE TREATMENT OF THE URETERAL STUMP

The management of the ureter has caused more discussion than perhaps any other phase of the subject, and it is the one which up to the present time has not been satisfactorily settled to all concerned. The many different ways of treating the ureter which have been advised is proof that the ideal method has not been obtained.

When nephrectomy was first recommended it was also advised to remove more or less completely the diseased ureter. The more recent train of thought seems to be to remove only a part of the ureter as much as can be conveniently removed through the lumbar incision which usually means to the brim of the pelvis.

Total extirpation of the ureter to the bladder or to include a piece of the bladder was not a very long lived procedure. These procedures were recommended by Alessandri, Garceau, Giorgano, Ramsey, Goetzel, Kelly, Reynolds, Israel, Kapsammer and others. This method soon fell into disfavor because it did not fulfill its claims because of the increased mortality rate and because it did not prevent post-operative fistulae. Although the present-day tendency is not to do extensive resections, Longard has described a new technique which has for its object the removal of as much of the ureter as possible.

The kidney is exposed by the usual lumbar incision, after the vessels have been ligated and the kidney freed, the ureter is freed down to the pelvis and a second incision is made parallel and close to Poupart's ligament. The incision is carried through the muscles to the peritoneum, the kidney and the attached ureter are pulled through this incision, after which the ureter is divided and fixed into the wound. In large kidneys or where there is danger of rupturing large pus-sacs, he divides the ureter in the kidney wound, covers the end with gauze and then pulls it through the lower incision with a forceps. His method slightly modified has been advocated by Lillienthal.

Suture of the ureter to the skin. This method was advised in order that the ureteral mucosa could be treated directly and to prevent infection of the wound with tuberculosis and fistula formation. Israel in his analysis of 1023 cases obtained figures showing that fistulae occurred in 10 per cent of cases in which the ureter was allowed to drop back into the wound whereas sewing the ureter into the wound was followed by fistulae in 16.3 per cent of cases.

Treatment of the ureteral mucosa has been varied. Kuemmell uses a special thermo-

cautery which is introduced into the ureter and Albarran, Tufner and others sear it with heat. Electrolysis has been advised. Israel prefers the injections of pure fluid carbolic acid into the lumen of the ureter, filling up the entire ureter and Koenig injects tincture of iodine. In order to bring about an early healing, Taschkis advises that the stump be given antituberculous treatment after the operation. Zuckerkandl recommends 6 per cent carbolic acid. The mucosa near the end of the ureter has been removed with a curette. Comment on these varied recommendations is unnecessary.

METHODS OF SEVERING THE URETER

These have been varied. The end of the ureter may be crushed with a heavy forceps and cauterized with carbolic or iodine. Others prefer to burn through the ureter very slowly with the actual cautery.

Invagination of the cut end of the ureter by a purse string somewhat similar to the technique in appendectomy has been suggested in order to insure a more thorough closure of the cut end either with preliminary crushing of the ureter or with ligating. Ligation and invagination have been criticised because the end containing the ligature lies in the lumen of the ureter. This method has been advocated by Koenig, Kuester, Pels, Leusden, Krecke, Jansen and others.

That occasionally special treatment is not necessary is demonstrated by Schlaginweit. In several cases the ureter was simply cut off and allowed to retract. The cases ran a usual post-operative course. Taddei has shown by experiments that the ureter closed quicker when it was not ligated. When it was ligated, hollow spaces formed in the walls resembling true cysts. There was never a trace of reflux of urine into the wound. The ureter atrophied quicker when no ligature was applied, therefore in non-septic conditions he advises against ligation of the ureter. One would not feel justified, however, to apply the results of Taddei's animal experiments in his own clinical cases.

At the present time, based upon past experience and results by far the largest number of surgeons are practicing less radical

measures than formerly so that only a partial ureterectomy is carried out.

I have never attempted extensive resections of the ureter being content to remove as much of the ureter as I could through the lumbar wound. Usually I was able to divide the ureter at the pelvic brim, and occasionally just below it. The ureter was divided between heavy artery forceps. The cut end was treated with carbolic acid and tied with heavy catgut, and allowed to drop back into the wound. The objection to leaving a stump of the ureter has been that it continues to pour infectious material into the bladder thereby infecting a clean bladder or delaying the healing of an already infected bladder. Who can say that a long stump is any more infectious than a short one?

Albarran Kuester Koenig and Pels-Luesden Suter Mayo Legueu, Cabot, Squier Borelius, Kidd, and others are all doing partial ureterectomies. Post mortem examinations of the stump after nephrectomy have shown that the ureter has undergone atrophy and been converted into a hard, fibrous cord.

Attempts have been made to modify the technique according to the pathological condition of the preter. Some believing that the technique should be based upon the condition of the ureter as found at the time of operation. As a rule however the condition of the ureter has not been taken into serious consideration.

Albarran's decision whether a conservative or radical ureterectomy should be carried out, is reached upon the ureteral findings. If the thickened ureter is increased in circumference because of a thickening of its walls and if its lumen is small he proceeds as usual in that he resects as much as can easily be resected and these cases heal without fistulae formation. If the ureter is very thick, and the lumen on cross section is dilated then and only then should ureterectomy be carried out as completely as possible. In these cases the vesical end of the ureter is dilated and altered. This is the type he believes, in which the bladder urine flows up the ureter and into the lumbar wound.

THE INFLUENCE OF EARLY DIAGNOSIS

Tuberculosis of the kidney is no exception to the rule that an early diagnosis is by far better than a late one. From personal observation I believe that cases in which an early diagnosis is made and in whom an early operation is performed have less bladder disturbance after the operation, and that bladder symptoms persist for a much shorter time than they do in those patients who come to us late in the course of the disease.

At rare intervals one may see a case in which there is no evidence of bladder or ureteral tuberculosis cystoscopically. This group of cases undoubtedly have a much better end result than do those in whom at the time of operation an extensive tuberculosis of the bladder exists.

By many these facts are held responsible for fewer ureteral fistulae and hence a shorter period of wound healing. One must not forget, however that in renal tuberculosis involvement of the ureter occurs quite early.

While many authors believe that fewer post-operative fistulae and a shorter wound healing are directly due to an early diagnosis and early operation, these views are not held by all. Some believe that post-operative fistulae are not due to any particular type of ureteral tuberculosis but to a better operative technique, rigid asepsis and a more careful division of the ureter.

PRIMARY CLOSURE

The formation or occurrence of post-operative fistulae and infection of the wound by tuberculosis has resulted in the various methods of treatment of the ureteral stump and the fatty capsule. The objects of these methods however were not attained. This failure was quite common so that some (Oppel, Stein) did not try to obtain primary wound healing. Instead they packed the wound with gauze and allowed it to heal by granulation.

This technique must of necessity prolong the convalescence and as a routine procedure can hardly be recommended, except in an occasional case in which the wound may have been contaminated by pus due to rupture of one of the thin walled sacs.

Quite the opposite treatment has been advocated by Mayo who advises against drainage. In cases in which the wound is soiled by infected material this is wiped out, the cavity filled with normal salt solution and the wound closed without drainage. If this method succeeds it will add greatly toward shortening the convalescence.

Cabot and Crabtree's interesting study of their cases closed without drainage show that only 25 per cent remained tight. Another fact of much significance brought out in their paper is that in their cases in which an abscess developed it occurred in three to five weeks after the patients left the hospital. This fact is especially significant when reporting cases

of primary closure unless the cases are watched after leaving the hospital one might easily come to wrong conclusions.

REGURGITATION OF URINE

Regurgitation of urine into the remaining ureteral stump and its discharge through the lumbar wound may be the cause of a persistent sinus. Tuberculosis of the ureter often results in a destruction of the ureterovesical valve so that there is nothing to prevent the flow of urine through the lumbar wound. This complication however is rare. I have seen it but once. One might be guided in his attempts to prevent this complication by the cystoscopic findings.

THE CLINICAL AND PATHOLOGICAL EVIDENCES OF THE POSSIBILITIES OF SPONTANEOUS HEALING OF RENAL TUBERCULOSIS WITHOUT TOTAL DESTRUCTION OF THE KIDNEY¹

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IN any discussion involving a number of terms which may be used with varying shades of meaning it is only fair that a complete understanding of what we mean by our use of words should be made plain that no doubt or question should arise later.

As evidence of renal tuberculosis we must have tubercle bacilli and evidence of renal inflammation coming from the kidney. It is not enough that these elements come from a bladder urine since genital tuberculosis in either sex coming from the epididymus or the prostate in the male or from the fallopian tubes in the female give such a urinary content it is not enough that the bacilli be found in the urine when obtained direct from the kidney if there is no other evidence of kidney involvement since it has been proved beyond doubt that normal kidneys excrete living tubercle bacilli coming to them in the blood from other tuberculous foci in the body. And in as much as no one will deny the possibility of small active tuberculous foci in the body

which are undiscoverable on physical examination bacilli alone in the urine cannot be accepted as evidence of renal involvement.

By healing we mean a complete destruction of a tuberculous focus so that no living tubercle bacilli remain. It is not enough that a caseous area is completely surrounded by a wall of fibrous tissue however dense so long as the center is not completely organized. Kurlow and Green by use of the microscope and guinea pig inoculation proved conclusively that as long as caseation existed there remained the possibility of further infection. It is true that under the best of artificial conditions a strain of tubercle bacilli will die in a comparatively few weeks but these are not and cannot be the conditions existing in the body and at present we have no means of knowing how long tubercle bacilli in a caseous mass can retain their vitality and power of doing harm. By healing then we mean the destruction of all of the tubercle bacilli and the reduction of the caseous nodule to a harmless condition.

By spontaneous healing we mean not only without any treatment at all but by the use of any treatment outside of the knife.

What can we accept as a sufficient proof of a healed renal tuberculosis? Nothing less than the operative or autopsy evidence of what we know is a characteristic organized tubercle or collection of tubercles taken from the kidney of an individual who showed during life tubercle bacilli and evidence of renal inflammation coming from that kidney.

Clinically there have been many reports of cases of renal tuberculosis where the diagnosis was certain and where either without any treatment or because of or coincident with the use of some special therapeutic agent the clinical signs and symptoms entirely disappeared and pus and albumin and tubercle bacilli could no longer be found in the urine and the vesical symptoms of irritability ceased and the patient gained in weight and general condition.

Pardoe reported 21 cases in which 5 appeared to be cured by the use of tuberculin in very early cases where there was little if any bladder involvement. But recognizing the possibility of long remissions in the signs and symptoms he did not consider proof of the cure at all complete.

Thompson Walker also considered the use of tuberculin as likely to give freedom from symptoms for a long time but did not believe that a cure ever resulted.

Keyes reported three cases before this association in which there was a remission of from 2 to 17 years. In the case with remission for the longest time the diseased kidney was entirely destroyed as proved at autopsy. In the other two there was a flare up of the disease and nephrectomy was done.

Hertz Boyer reports one case in which there was no suspicion of tuberculosis in the history physical examination, or cystoscopy. Re-examination two months later showed a closed left kidney which had not been diagnosed on the first examination. A few months later the patient died of uremia.

He cites another case in which a patient was supposed to have been cured of renal tuberculosis, but twelve years later had a swelling in her loin which did not interfere

with her general health and activities so that she did not consult with a physician for eight years more. A nephrectomy done at that time showed a totally destroyed caseous kidney.

Mantoux advocated the use of tuberculin in renal tuberculosis and claimed that the general health was much improved and also that the local condition was changed for the better and although among seventy cases which he observed some were at one time or other almost free from symptoms, he nevertheless did not claim a cure by means of medical treatment and insisted that operation gave the only chance.

Le Clerc Dandoy adopted Keersmaecker's method of administering tuberculin treatment which consists in giving intravenous injections of cinnamyl acid every week, increasing the dose up to 20 mg. At the end of six months this is stopped and the tuberculin is given in slowly ascending doses. He reports five cases in which a diagnosis of renal tuberculosis was made and in which after several months treatment by the mixed method the symptoms entirely cleared up and the urine became entirely normal. Two of the five cases give all of the symptoms necessary to make a diagnosis, but the final proof of cure is lacking.

Pousson has reported one case with remission of symptoms for eighteen years and then further trouble and he has become reluctantly convinced that renal tuberculosis cannot be cured except by removing the kidney.

None of the reported cases on close examination fulfil all of the requirements necessary to establish definitely the proof of a cure and many of them do not have all of the data possible to obtain during life. The cases reported by Keyes showed at one time all of the clinical phenomena consistent with a cure and had the final flare ups not been reported would have been used as evidence of a cure instead of standing as they do as strong arguments against. In the literature on renal tuberculosis I have not been able to find any case reported which shows positive proof of the disappearance of a renal tuberculosis.

The following reports of cases studied on the Genito-Urinary Service at the Massachusetts General Hospital are of considerable interest in this connection

G U Service No 03058 Female age 31

Symptoms of intermittent pain in left side for three months no other symptoms and well up to that time. The urine showed a moderate number of leucocytes no albumin, no growth on culture but a diphtheroid bacillus in smear Cystoscopy showed that the leucocytes came from the left kidney. Operation by Dr Cabot showed that the upper pole contained a cyst shut off from the pelvis of the kidney. The upper pole was resected under the impression that it was a solitary cyst no suspicion of its nature being entertained. Normal convalescence. The diagnosis was only revealed by the pathologist.

G U Service No 20473 Female age 48

Four months symptoms of chills fever and weakness slowly increasing with an ache in the left flank. The examination was typical of a coccus infection of the left kidney with perinephritic abscess. Operation showed this condition and because the kidney was badly damaged it was removed. Pathological examination showed the coccus infection but in the upper pole was a small caseous cavity partly organized which was tuberculous.

G U Service No 180035 Female age 54

Five years ago urgency and frequency and three years ago tumor in left flank. Nephrotomy was done at this time. Sinus persisted and two years ago an attempt was made to cure this by operation without success. Nephrectomy was done.

Pathological report. Section showed no kidney substance. A number of small abscesses filled with thick pus but a large amount of the tissue consists of soft yellowish material. Microscopical examination shows the kidney tissue replaced by a round and epithelioid cell growth throughout which were masses of large scattered giant cells.

In these cases there was a shut off tuberculous process which it was impossible to diagnose as such without microscopic study but in one no evidence at all of any attempt at healing in one only a slight attempt while in the third a considerable degree had gone on, yet in no sense of the word to completion.

Pathological evidence at our command is unfavorable to the possibility of the healing of tuberculosis of the kidney. Wherever tubercle bacilli lodge and start to develop they arouse a reaction which is essentially the same under all conditions the particular tissue invaded causing only minor differences. The process of growth and attempt of the tissue at walling off and healing the damage is likewise essentially the same. Histologically the process is in brief as follows. The pres-

ence of the bacilli is the signal for an accumulation of endothelial cells around them in an attempt to neutralize in some way the damage being done. These endothelial cells together with lymphocytes and new connective tissue cells gradually get more numerous and the shutting off of the blood supply begins in the center of the tubercle. If healing is to take place the newly formed connective tissue cells grow into this necrotic center and gradually absorb and take the place of it. There may be a hyaline degeneration of this ingrowth but the round cell infiltration and the more or less characteristic center always remain to mark the spot. In the larger tubercles the caseous center may be replaced by a calcification surrounded by a dense fibrous wall. This picture is characteristic and can be distinguished from the scars in the kidneys of various origin which masquerade in the literature as healed tubercles. Both types are found in the foci of healed or obsolete tuberculosis elsewhere in the body. That this is the natural process which should take place in the kidneys we know from a few reported cases where such an attempt has been made but without success.

Harbitz reports a number of autopsy and post-operative cases where the tuberculous process had disappeared after complete destruction (autonephrectomy) of the kidney but one case of particular interest.

A woman age 33 with symptoms of right-sided kidney trouble for two years. Tuberculosis could not be found. Nephrotomy showed nothing wrong but the wound left a permanent sinus. Three months later nephrectomy. Macroscopically no evidence of tuberculosis, but microscopically there are typical tubercles some of which have gone on to almost complete organization but some of which still are active.

Wildbolz recognizing that a marked improvement in general condition followed the use of tuberculin in many cases thought that a corresponding healing might take place in the infected kidney. In four cases he used tuberculin for 2 to 12 months before operation with improvement in general health and with some benefit as regards symptoms. He did a nephrectomy in all of these cases and examined the kidneys care-

fully to see what, if any healing had taken place. Nowhere was he able to find any evidence of any process which suggested an attempt at healing. He concluded that although medical treatment might improve the general condition of a patient with renal tuberculosis it did not in the least help the local lesion and that removal of the kidney was the only permanent cure.

Zuckerlandl in discussing the possibility of the shut off tuberculous pyonephrosis also describes the indurated tuberculous kidney where the tissue reaction has resulted in a partial healing of many of the foci with a marked fibrous tissue reaction around the tubercles and a sclerotic condition of the whole kidney with a thinning of the cortex and a hardening of the parenchyma. In one case which he describes there was also a fatty infiltration of the tissue near the pelvis. But in all of the cases there were demonstrated one or more small active foci. It is to be noted that this process is destructive of the kidney and not healing. Zuckerlandl concludes that induration of a tuberculous kidney and hardening of the parenchyma may be taken as a local recovery but never absolute. (One might suggest that this type of healing is not of advantage to the kidney.) The diseased kidney even after complete induration is always a present menace to the other kidney and its removal is urgently recommended.

Reasoning from still another point of view suggests that healing should be a difficult if not an impossible task. Immunity is aroused very slowly in the body by a focus of tuberculosis anywhere. In the lungs where the anatomy is such that the growth may be very slow in extension and yet the blood supply so abundant that the toxins are rapidly absorbed and disseminated and the greatest opportunity given for antibodies to be formed such an immunity is often aroused and the process limited, walled off and finally healed before it has become too large to handle. In the kidneys the conditions are slightly different in that extension takes place more rapidly and the antibodies are formed less quickly. By the time these antibodies have been formed to any great extent the focus

is so large that the most that can be accomplished is the walling off of the process without complete healing. Whether this is the exact explanation or not really matters little but I am convinced that the question of immunity is the real answer to the problem. In reviewing the course of the patients on whom nephrectomy for tuberculosis had been done at the Massachusetts General Hospital Crabtree and Cabot found that the cases which had done the worst were the early cases those in other words who had not had time to arouse an immunity. Other reports from other clinics revealed the same thing.

I had one experience of this kind which illustrates this condition.

A boy of 18 came for slight frequency. His urine was clear but contained a slight trace of albumin. Cystoscopy showed slight reddening around one ureter and on the strength of that he was sent into the house for a further study. When he came in a short time afterward I was unable to confirm the diagnosis. The bladder was entirely normal. The function of both kidneys was equal. The urine from both kidneys was clear and sparkling. There were no pus-cells from either side. There was the slightest possible trace of albumin from the supposedly affected kidney. Guinea-pig inoculation on this occasion showed no tuberculosis. I watched him very carefully during the following year. At one time a pig was reported positive from the sound side. He finally developed clear cut signs of renal tuberculosis and I did a nephrectomy. He went steadily down hill from the first with what was apparently a generalized tuberculosis. The kidney showed a tuberculous abscess in one pole without the slightest attempt at healing.

Corbus in a paper before this association in which he dealt with the question of immunizing patients before operation makes out a good case on the grounds of preventing a rapid dissemination of tuberculosis from the stirring up of the operation. Many other authorities have advocated a preliminary tuberculin treatment. If we reverse this evidence we find in it a very strong suggestion that there is no process going on in the body in this disease which has any marked tendency to cause healing or else the immunizing process would not be necessary. This seems to me to be the keystone to the whole question. If a person has a strong natural immunity to start with an initial infection will not gain a foothold. If a process does start in the kid

ney the slow course of the formation of anti bodies in comparison with the spread of the lesion allows the disease to get beyond the point where it can be entirely obliterated although it can often be walled off so efficiently that the symptoms cease and the condition becomes latent but capable of further mischief if for any reason it gets loose.

It would seem to me from a study of the cases reported in the literature from pathological study and from reasoning in connection with immunization that the healing of a tuberculous focus in the kidney is impossible.

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OBSERVATION ON ONE HUNDRED AND THIRTY-THREE CASES OF GALL-BLADDER SURGERY WITH ESPECIAL REFERENCE TO THE POST-OPERATIVE TREATMENT

BY R I RHODES A B M D AGUSTA, CONN
 From the Jefferson Hospital, Rock, Vermont

THE cases reported in this paper were patients in the Jefferson Hospital prior to July 1 1915 and were operated upon by Drs Hugh H Trout and R L Rhodes. As this article is chiefly a post-operative study, lues malignancies, deaths, and of course non-operative cases are excluded. Though the number is small the value of hexamethylenetetramine seems so pronounced that it was thought appropriate to publish the results in order to stimulate a further study in other and larger clinics.

Of the 133 cases 32 were male and 101 female. Of the 32 males 18 suffered from cholecystitis 6 acute and 12 chronic and 14 had stones. Of the 101 women 22 suffered from cholecystitis 1 acute and 21 chronic while 79 had stones. Thus in men 43.75 per

cent showed gall stones whereas in women practically 79 per cent. Concerning the location of the stones 31 or 34.8 per cent were in the gall bladder alone 22 or 23.6 per cent in the gall bladder and cystic duct 7 or 7.5 per cent in the gall bladder and common duct 7 or 7.5 per cent in the cystic duct alone 3 or 3.2 per cent in the common duct alone 2 or 2 per cent in the cystic and common ducts and 1 or 1 per cent stones were found in the gall bladder, cystic and common ducts. It is odd that in none of these were stones found in the hepatic duct yet since July 1 three such cases have been encountered.

In women we had 56 cases under 40 years of age and 45 cases more than 40. In men 9 under and 23 more than 40 years of age. The table of ages according to decades follows:

	Male	Female	Total
d	1	0	1
h	1	2	3
h	8	20	28
h	5	34	39
tal	—	—	—
	0	56	56
	8	19	27
	10	—	31
h	3	4	7
h	2	1	3
tal	—	—	—
	33	45	78

re a definite history was obtained the
ive a history of typhoid fever in 59 per
f the cases, the women in only 24 per
pneumonia, men in 47 per cent and
i in only 18.5 per cent however the
made up for this by giving a history
pneumonia in 86.33 per cent. Jaundice
resent or had been noted in previous
s in only 48.5 per cent. The urine
thologic in 34 per cent which includes
es showing even a trace of albumin or
hyaline casts in other words anything
absolutely normal. There were heart
in only 15 per cent, including all
s other than absolutely normal the
st lesion being the Adams-Stokes syn
in a man 76 years old.

case is worthy of detailed report be
of the unusual clinical history

age 4 brought his son to the hospital
n acute appendix. The father obtained
a home in which there was case of typhoid
During his stay in town the father con-
us, giving a history suggesting a chronic
stitis over a period of about four years. On
l examination this was confirmed and such
osis given. He took his son home on th
lay. Five days later he returned t the
l with a very acute cholecystitis and t
on the gall-bladder was found distended
t the point of rupture. Cultures from the
s of the gall-bladder yielded a pure culture
ilus typhosus. He rapidly improved, the
ture was normal on the fourth day but
to rise again on the sixth day and con-
through a very typical typhoid fever, blood
and Widal both being positive. In the
week of his typhoid he developed a large
al abscess which when opened yielded
typhosus in pure culture following this,
valence was uninterrupted.

point of interest here is the very
assumption that, having a chronic low

grade cholecystitis, he fell a victim to poor
prophylactic precautions in the boarding
house and developed the disease, and as the
resistance of the gall bladder was already
lowered the acute infection manifested itself
there before it became systemic.

There were 4 cases in which the gall-bladder
gave symptoms during the course of typhoid
fever all of which came to operation with an
acute cholecystitis in less than three months
time. The operation consisted in the removal
of stones where present and the drainage of
the gall bladder by means of a large rubber
tube introduced into the gall bladder and
anchored with chromic catgut. The opening
in the gall bladder was closed with a purse-
string suture of chromic catgut, care being
taken to invert the edges. Two or three
cigarette drains were placed below and around
the gall bladder.

Post-operative treatment. The patients are
placed in bed in the prone position and
ordered to have nothing by mouth. Procto-
lysis by the Lawson method is given—water
dextrose or sodium bicarbonate, either or in
combination as indicated—and morphia gr $\frac{1}{8}$,
hypodermically every 3 hours, if necessary.
Water is usually not allowed by mouth within
24 hours if there has been any appreciable
nausea and is withheld longer if much nausea
or vomiting exists. Gastric lavage if in-
dicated.

In this series of cases the above outline
constituted the basis of the routine treat-
ment in 77 cases in which the average dura-
tion of drainage was 35 $\frac{1}{2}$ days. In 56 cases
in which the average duration of drainage was
39 $\frac{1}{2}$ days—a difference of over six and one
half days—the same treatment was used
and in addition hexamethylenetetramine in
doses of 50 to 80 grains daily. In cases in
which much pus was present at operation the
character of the discharge cleared up more
promptly in those getting hexamethylene-
tetramine. For example

A male, age sixty-two chronic cholecystitis with
subacute flare-up. In spite of free drainage he
continued to run temperature daily of 100 to 101
until the tenth day when he was given large doses
of hexamethylenetetramine. In two days it was
normal and remained so throughout the rest of his
stay in the hospital.

In none of these cases has there been any trouble referable to the gall bladder but among those who were not given hexamethylenetetramine several have had some trouble

One male age sixty had a cystic and common duct stone with a chronic cholecystitis which drained for 44 days. He returned to the hospital two months later with the history that his gall bladder had drained intermittently for five weeks. When not draining he would have attacks of pain nausea and vomiting such as before operation. During the last three weeks there had been no drainage and he had had five attacks. He was given hexamethylenetetramine in fifteen grain doses four times daily since which his symptoms have disappeared.

Another case a female age 24 had stones in the gall bladder and cystic duct which were drained for 48 days when she left the hospital apparently all right. Four and a half months later she returned to the hospital having had attacks of pain nausea and vomiting as before operation. She was given 10 grains of hexamethylenetetramine every four hours with prompt relief and has had no further trouble. Another case a female age 21 had stones in the gall bladder and an acute cholecystitis. On sixth day after operation her temperature ran up to 100. The wound drained thick mucopurulent material. Hexamethylenetetramine as begun and two days later the temperature began falling character of discharge improved until on the eleventh day the temperature was normal and bile drainage with very little pus in it. Further convalescence was uneventful.

In making this comparative study no attempt was made to select the cases but for the most part they were taken alternately with and without hexamethylenetetramine. The larger number without is due to the fact that those having been in the hospital before

the study was begun are included because the difference in drainage time is so marked it was thought best to get as large a number as possible for an average drainage time.

Even though the series is small it would seem beyond the realm of coincidence that those getting hexamethylenetetramine should have an average drainage of 60 days less and when it is noted that the character of drainage improves later and that the end results are more satisfactory inasmuch as not one who were given it have had any symptom referable to the gall bladder after leaving the hospital — as contrasted with at least four among those who did not — it would certainly seem that the use of hexamethylenetetramine would be a valuable adjunct to our post-operative treatment in lesions of the gall bladder and duct.

It is possible that the indication for cholecystectomy may be lessened especially in the sugary type in that there were several of the mulberry type gall bladder in the series who were given hexamethylenetetramine and who have obtained perfect relief.

NOTE — During the first few days following operation hexamethylenetetramine is given by proctocoly because at first the patient are not allowed fluid by mouth and later to avoid any possibility of upsetting the stomach. After the first week it is given by mouth. The idea has been to give the drug five days each week and omit for two days to prevent any untoward symptom. However should these develop earlier it is stopped for a day or two and then begun again.

PRELIMINARY HÆMOSTASIS IN GOITER OPERATIONS

By Dr. F. DE QUERVAIN, BASEL, SWITZERLAND
Professor of Clinical Surgery

GOITER operations are based on one of two principles: either the surgeon follows no special plan, excising the goiter as he would any other tumor and ligating the blood vessels as they bleed or he follows methodically a definite plan based on the anatomy of the thyroid gland. The first mentioned procedure predominated in the early days of goiter surgery; for the past 30 years, however, the methodical plan has been recognized as the only correct one.

Though most surgeons of the present day follow the second plan, their methods in operating still differ materially. Some show atavistic leanings toward the older method. It is true, they expose the goiter according to rule, free it from its surrounding tissues, and luxate it, clamping and ligating the vessels when blood flows. Others proceed more logically. The goiter once delivered the arteries are ligated successively as it is the area supplied by the arteries from which the principal hemorrhage may be expected. With this step it seemed the summit of logical operating had been attained. Yet it was not so.

Let us follow an operation on an exceedingly vascular goiter with strongly developed capsular veins. We find that the shelling out of the diseased gland from its enveloping thyroid fascia, the so-called external capsule and its dislocation can sometimes be an excessively sanguinary proceeding. If then, we apply ligatures to the most important arteries after luxating the goiter, we apply them too late for one of the most sanguinary stages of the operation. Therefore we see that to be really logical we should ligate the principal blood-vessels before shelling out and luxating the goiter. This line of reasoning led me five years ago to modify my operative technique which coincided with that of Kocher and to develop a method which would emphasize the principle of preliminary ligation more forcibly than had hitherto been the case.

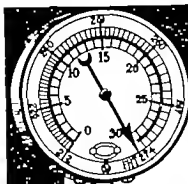
The chief point in question was the ligation of the most important arteries before doing anything whatever to the goiter. In addition to the above mentioned motive of exposing and luxating the goiter with decreased hemorrhage a further consideration presented itself, viz. that the delivery of a profound, intrathoracic, richly vascularized goiter is much easier after the circulation has been interrupted than when blood is coursing through the blood vessels. Further my method protected the recurrent laryngeal nerves more efficiently than the technique heretofore used and the same time preserved the parathyroid glands.

I described my method first in December 1911 and then more fully in the spring of 1912.

After these few introductory remarks, I shall describe briefly how the different arteries can be ligated. We will begin with the *arteria thyroidea inferior*. As I explained in my previous paper, this artery is, as a rule, the chief source of blood supply to the goiter. Formerly, but quite wrongly, its ligation was supposed to be difficult. A glance at the accompanying schematic sketch (Fig. 1) will show us that this artery can be ligated at four different points.

a. Billroth tied the artery quite close to the goiter. Until recently Halsted ligated it at its entrance to or to be more exact, within the goiter ("ultraligation"). In our publication of 1912 we pointed out the disadvantages of his procedure and see with pleasure that Halsted himself has recognized our reasons, and that from his paper of 1913 he has given up ultraligation. We feel gratified that our views now coincide with those of an American surgeon who has probably contributed more than any other of his compatriots to the investigation and promotion of the anatomy of the goiter and the thyroid gland.

b. Kocher's method is much more expedient, as it secures greater protection for the



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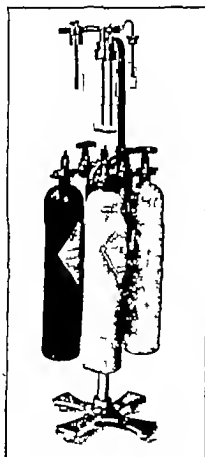
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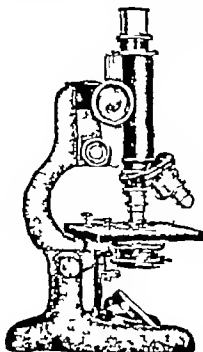
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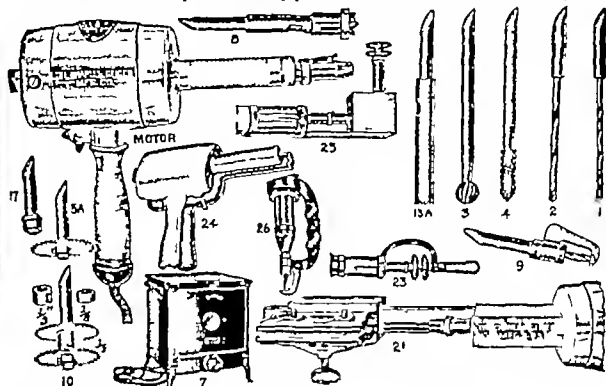
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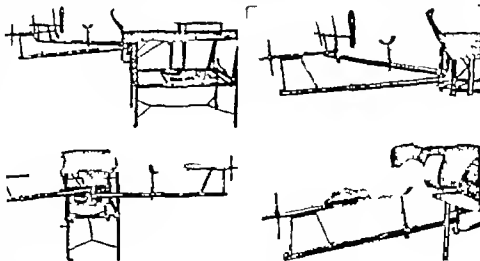
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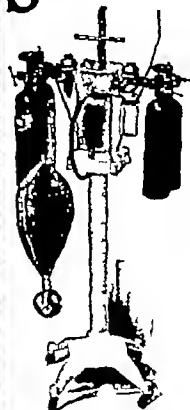


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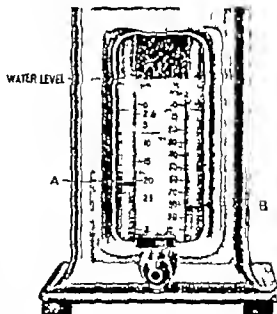
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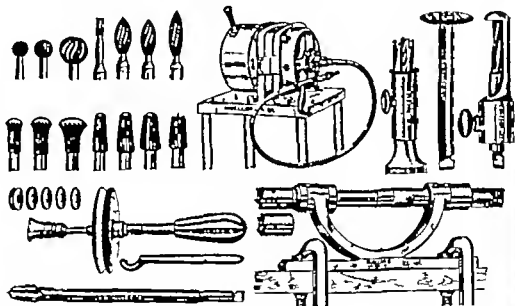
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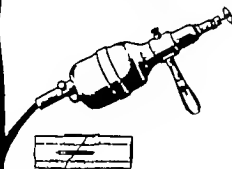
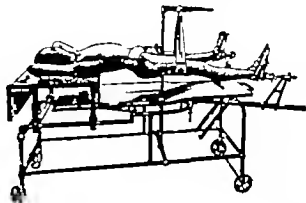
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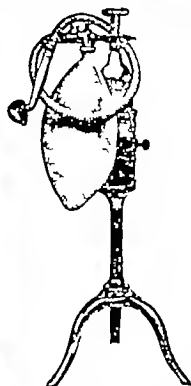
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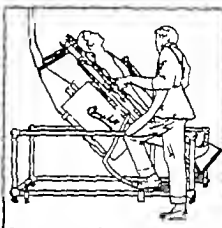
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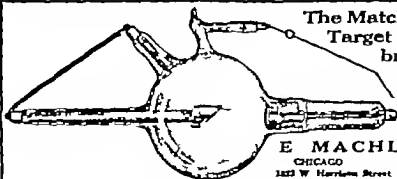
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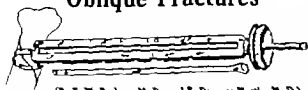
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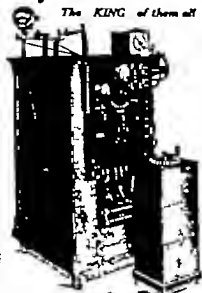
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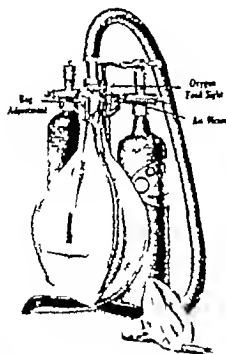
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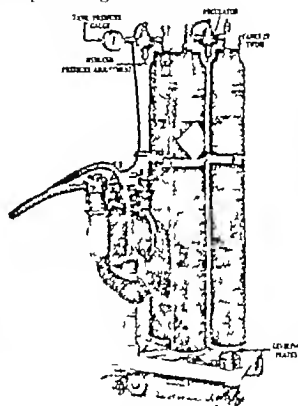
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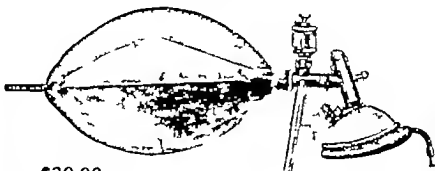
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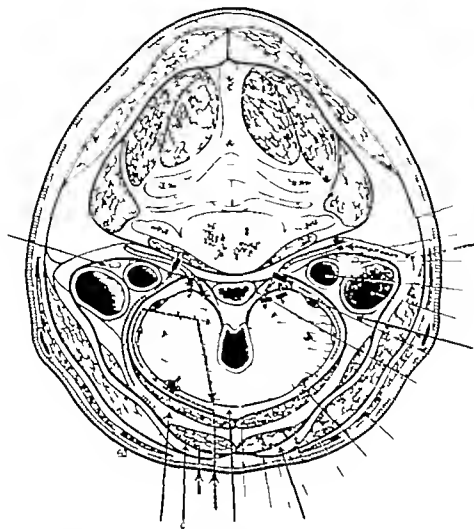


Fig. Schematic outline of the fasciae and spaces in the region with the thyroid gland obtained by means of injections into the anterior and posterior jugular spaces. The fasciae are depicted by curved lines, more or less thick, depending on their importance.

A: thyroid space (patium thyroideum); B: sternohyoid space (patium sternohyoideum); C: sternomastoid space (patium sternomastoideum); D: space containing blood vessels. The spaces are here schematically outlined as are actually enlarged by the mass injected.

1: Entrance to the anterior thyroid artery; 2: the purpose of this ligature (de Ouverain method); 3: Entrance to the posterior thyroid artery; 4: Cystic proper of the thyroid gland; 5: the so-called internal jugular; 6: Internal fascia of the small muscles; 7: the so-called internal jugular; 8: External fascia of the small muscles; 9: Sternohyoid muscle; 10: Entrance to the inferior thyroid artery; 11: inferior goiter operation; 12: Bulbous method—Kocher applies the ligature more laterally; 13: Sternohyoid muscle; 14: Halsted ultraligature; 15: Sternocleidomastoid muscle; 16: Sternohyoid muscle; 17: Common carotid artery; 18: Parathyroid gland; 19: Internal jugular vein; 20: Entrance to the trunk of the inferior thyroid artery; 21: Recurrent nerve; 22: Durovnik, Alama, and Roger; 23: Sympathetic nerve; 24: Inferior thyroid artery.

recurrent nerves and the parathyroid. The ligature is applied after the goiter has been lifted from its bed in the space between the thyroid gland and the thyroid fascia but as laterally as possible. One slight disadvantage

of this method however is that when seeking the artery we are not separated by a layer of fascia from the recurrents and the epithelial bodies; therefore the care of these two structures demand great attention. The result

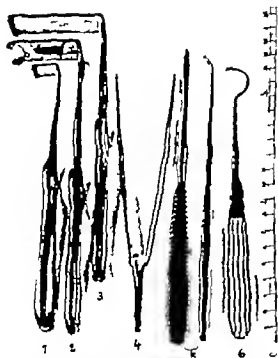


Fig. Special instruments for goiter operations. 1 and 2 retractors of different sizes. 3 long blunt dissector, 4, narrow elevator used for raising and detaching the inferior artery from its surroundings, 5 fine sharp, no (Cooper's) needle.

hitherto obtained and still obtained by Kocher and many other surgeons by means of this method prove that with sufficient practice the above mentioned structures may be protected with a good degree of certainty. Still one disadvantage remains viz. in order to reach the artery the operator must penetrate the space containing the most veins consequently there is risk of extensive venous hemorrhage before reaching the artery especially in the case of richly vascularized goiters, and more particularly in the case of Graves disease.

c. Surely then it must be more advantageous to ligate the artery somewhat farther away from the goiter in the space containing the small thyroid muscles, outside the thyroid fascia (the so-called external capsule of the goiter). This is the method we have employed since 1911. Later on we shall describe it more fully.

d. Finally we can ligate the ascending branch of the artery as Dietrich first and

later Langenbeck seem to have done, on the outward side of the carotid artery. To this end Langenbeck incised transversely the sternomastoid muscle whereas Drobniak, taking into account the regional anatomy proposed penetrating laterally from the outside border of the above named muscle a proposal adopted again later (25 years ago) by Billroth, Rydygier and Woelfler also by Reverdin and recently by Alamartine and Rogers. It is clear that in proceeding thus the surgeon intervenes at quite an unnecessary distance from the field of the operation. Moreover as far back as 1891 Woelfler drew attention to the fact that this method is conducive to lesions of the sympathetic nerve. Old as it is, it does not seem to have found its way into the practice of goiter surgery and Alamartine's most recent recommendations of it are based only on anatomical considerations. Rogers only has employed it in 37 of his cases.

The foregoing demonstrates that we prefer ligating in the space between the outer plane of the thyroid fascia and the inner side of the carotid artery.

Before entering into further details we must say a few words about the spaces and fasciae round about the thyroid gland. By means of gelatine injections we have in various ways investigated the thyroid region in cadavers. Mr. E. C. Jones translated in this journal a summary of these investigations from our article mentioned above. It was however unduly ascribed to Poulsen whom Jones mentioned on account of his investigations of the other fasciae of the neck but who has never examined the spaces round about the thyroid gland.

Our method of procedure was as follows. We injected differently colored gelatine into the various interstices round about the thyroid gland of the cadaver. A transverse cut through the neck after the injected mass had hardened showed us the extension of the different spaces now filled out with gelatine. We devoted another series of experiments to the special study of the fasciae, proceeding as follows. We injected completely transparent gelatine under high pressure into all the

At the Carotid Artery.

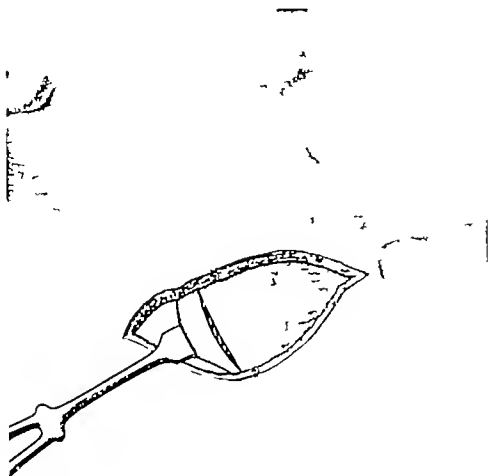


Fig. 3. Skin and platysma incised. Muscle at rhinocleidoma tied up, treated outward. The internal fascia of the small muscles, vertically lined, for the sternohyoid muscle.

spaces. We then excised a transverse section 2.5 centimeters thick from the neck, fixed it in Kaiserling's solution and embedded it in transparent gelatine. Thus we obtained excellent preparations which had so to say been artificially rendered oedematous to such a high degree that the course of the fasciae could be traced into their very finest layers.

The arteries of these preparations were filled at the same time with red and the veins with the blue gelatine. The anatomical conditions found were the following (Fig. 1).

The thyroid gland is enveloped in a thick layer of its own fibrous tissue called the capsule propria (according to Kocher the epithyroidium). This fibrous envelope cannot be detached from the thyroid gland as for instance the fibrous capsule can be detached from the kidney or to be more exact it forms an integral part of the gland. The

thyroid gland is surrounded by a space containing fine layers of connective tissue and veins. This space into which only a liquid mass can be injected is called the *spatium thyreoideum*. In front it is bounded by a layer of fascia viz the inner fascia of the sternohyoid muscle which more laterally forms the median boundary of the blood vessel sheath. We adopt for it the same name as Corning and other anatomists the *thyroid fascia*. It corresponds with what is generally called the *external capsule*. More posteriorly this fascia separates into single lamellae which take their way to the trachea, the oesophagus and the spinal column. Around the thyroid fascia we find another space containing muscles viz the sternothyroideus, the sternohyoideus and a portion of the omohyoideus. We call it the *spatium sternohyoideum*. Its outer wall consists of a strong fascia viz

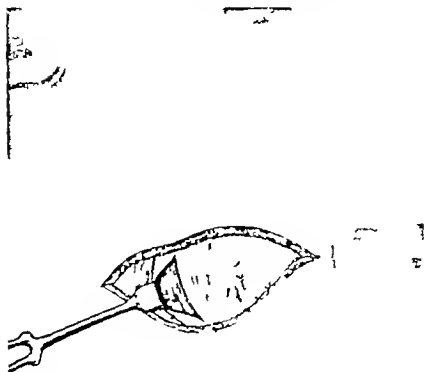


Fig. 4 Small retractor in position. Sternohyoid muscle exposed. The forefinger will now be deep! incision in median direction to seek and expose the inferior thyroid artery.

the outer fascial covering of the sternohyoid muscle. As such it overlies the thyroid region stretching from there to the rear. On the outer side of this space we have finally the space containing the sternomastoid muscle the *spatium sternomastoideum*. The blood vessel sheath lies to the rear of the spatium thyroideum and the spatium sternohyoideum. The chief component of its median wall is the fascia thyroidea its anterior outer wall being formed by the fascia thyrohyoidea. Behind the blood vessel sheath and anteriorly from the profound neck fascia the inferior thyroid artery takes its upward course penetrating the posterior portion of the thyroid fascia on the median side of the carotid artery. The parathyroids and the recurrents — the latter within the field of operation — are both situated in the spatium thyroideum. For that reason and because

it contains numerous capsular veins we avoid the spatium thyroideum as an entry to the arteria thyroidea inferior. Therefore we have at our disposal only the spatium sternomastoideum. The last named space starting from the median border of the sternomastoid muscle is the one which has since the time of Velpeau, Farabocuf and Kocher been noted in surgical textbooks as the best entry for the application of an isolated ligature to the inferior thyroid artery. The operator frees the median border of the sternomastoid muscle and then penetrates between it and the fascia of the sternohyoideus. Certainly the artery sought for can be reached in this way, but the jugular vein is always reached first and is liable to injury if great precaution is not exercised. The following course which we proposed for the first time in 1911 is therefore very much to be preferred.

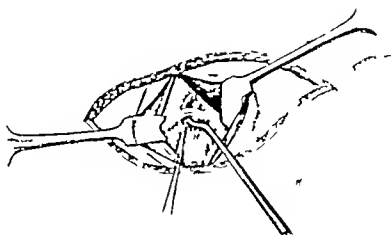


Fig. 5. A larger sized retractor has now been inserted. The inferior thyroid artery has been bluntly disengaged from its surroundings and will be ligated.

We employ Kocher's collar incision dividing at one sweep the skin, subcutaneous fat and platysma myoides. After ligating the superficial veins we free the median border of the sternocleidomastoideus and draw it so far outward with a blunt retractor that the surface of the anterior fascia of the small muscles becomes visible. We then make a vertical slit of about 2.5 to 3 centimeters long in the latter mentioned fascia (Fig. 3), pare it back bluntly and catch it up with the retractor (Fig. 4). We now work bluntly with a finger insinuating it deeply in a median direction along the median side of the common carotid. This artery we release from its median surroundings and come into touch almost immediately with the arteria thyroidea inferior which passes at a right angle to and underneath the carotid artery in a median direction (Fig. 5). If necessary we now replace the retractors by others reaching some

what deeper so as to bring the artery into view and with the aid of two long blunt dissectors 17 centimeters in length (Fig. 2) separate and raise it from the deep neck fascia with a narrow elevator we have had made especially for the purpose (Fig. 1). The ligature thread is now slipped round the artery with an especially lightly constructed Cooper's needle. In simple cases the whole proceeding from the skin-cut to the tying of the ligature does not take more than a few minutes.¹

As a rule no vein whatever except one or two surface veins interferes with the application of the ligature. In other cases the vena thyroidea media crosses the arteria thyroidea inferior. However the operator is rarely obliged to ligate the vein in order to gain access to the artery.

¹ This method is briefly translated from my paper and published in *J. Soc. & Obst. Gyn.* by E. O. Jones but is original.

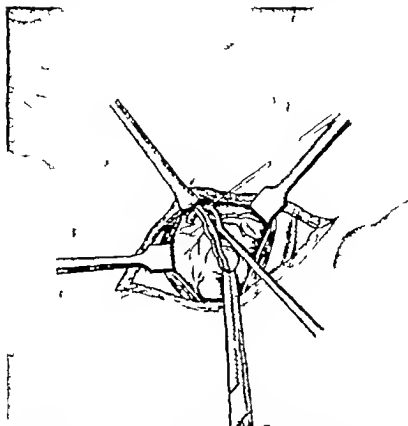


Fig. 6. Spatium sternothyroideum is dissected and a view is now obtained somewhat more medially, through the small muscles and the thyroid fascia immediately in front of the thyroid gland (in the spatium thyroideum). The goiter is retracted downward and before ligating it, in order to ligate the superior thyroid artery or its inferior branch.

The ligature applied, the question arises as to whether the goiter itself requires surgical treatment. If so we leave our space work our way in between the small muscles (Fig. 7) free the goiter whose capsular veins now hardly bleed at all luxate the goiter and undertake whatever the existing circumstances demand excision, resection or enucleation as shown in the accompanying illustration (Figs. 7 to 9).

The inferior thyroid artery being as we know somewhat less regularly existent than the superior and its course also less regular we ask ourselves how often the ligature can be applied in the above-described manner. During the first period in which we operated on these lines, it was possible in 89 out of a hundred cases. In a later series we met with no obstacle in 95 out of a hundred cases.

In only 5 cases was the ligature impossible owing to the non-existence of the inferior thyroid artery or to its too profound situation.

The only real difficulties in the way of applying the ligature in the above-described manner occur when for instance the artery is situated too far thoraxward, or is too far overlapped by the goiter. In most cases the two obstacles may be overcome by using sufficiently long suitably constructed retractors. Sometimes the operator is surprised during the subsequent goiter operation by an unexpectedly strong hæmorrhage after having as he supposes accurately ligated the artery. The reason of this is generally that the ligature has only been applied to the superior branch of an inferior thyroid artery which divides abnormally near to its origin. In reality this occurs

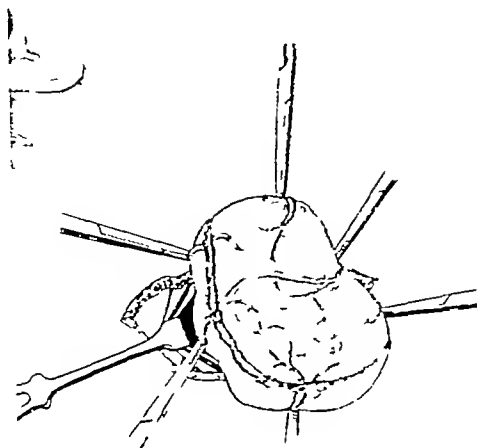


Fig. 1. Diagram of the goiter operation.

T. 100

much less frequently than certain anatomical investigations would lead us to expect.

One condition demanding attention is that it may lead to most unpleasant results. In this instance it may happen that when the surgeon is about to slip the Cooper needle around an inadequately separated artery or has inadvertently tied the ligature too tightly a brittle vessel tear or is cut through and it is not always easy to locate the vessel again. This of course is more likely to occur in the case of older persons or persons with Graves disease. These unfortunate circumstances may all be avoided by carefully isolating the artery with two blunt dissectors and the narrow elevator and by not drawing the ligature thread too tightly. In the case of brittle arteries it is advisable to employ a strong catgut.

The neighboring organ and structure to be considered are the trachea and

the posterior lobe and the subcutaneous tissue.

The handling of the trachea is very easy at the level of the ligature. It is separated from the artery by the previously described thyroid dissection and is invisible during the whole operation which is one of the chief advantages of my method.

On the goiter we operated upon from the beginning of July 1911 until the end of August 1911 we had the opportunity of examining at a later date 30 cases and especially of ascertaining the exact condition of the vocal chord. Among the 19 cases operated on according to my method comprising 6 ligatures of the inferior artery.

In only one case of permanent paralysis of the recurrent nerve had occurred and that not in consequence of the ligature but of the handling at the exact junction between which and the trachea an adhesion had to be

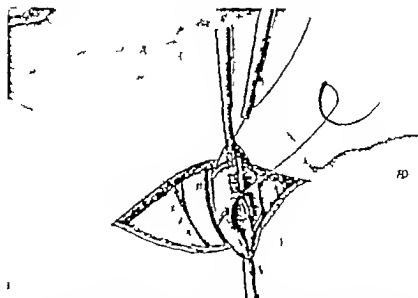


Fig. 8. Gouter removed by means of resection, enucleation, or combination of both. The largest veins and the anterior branch of the superior thyroid artery are ligated. The smaller ones have been drawn into the harmonic suture. A lobe of almost normal size has been formed out of the remaining gland tissue.

severed. Two further cases of permanent paralysis of the vocal chords occurred after operations on the old lines (intraligamentary ligation of the artery). In 8 cases we found paresis such as any method may occasion through stretching of the nerve during the process of luxating the gouter. All these 8 cases of paresis were on their way to recovery. The cause of these paralytic conditions was not always to be determined with any amount of certainty. Particulars of the cases will be found in my recent paper and in that of my assistant, Dr. Hoessly, in the *Deutsche Zeitschrift fuer Chirurgie* December 1915. The chief point is that among 250 gouter operations only 3 cases of permanent injury to the recurrent nerve occurred, and that of these 3 only 1 occurred among the 197 cases operated on with the new method.

Secondly the parathyroids must be protected. The thorough investigations, notably of Erdheim, Halsted, Geis, Evans, Bérard, Alamartine and Iversen, with regard to the blood supply of these organs, prove that each of them is supplied by a fine branch of the *arteria thyroidea inferior* or by the branch artery connecting the inferior with the *arteria*

thyroidea superior. A little simple reasoning will make it clear that this fine blood supply can most effectually be protected by ligating the large arterial trunks as far away from it as possible. This course alone insures the safety of the fine *arteria parathyroidea* during the operation and provides as large a field as possible for the collateral circulation. Therefore the farther away from the thyroid gland a ligature is applied to the inferior thyroid artery the less the danger of injury to the parathyroids. For the past five years I have advocated this principle and am glad to see that it is becoming more and more recognized. Up to the present I have in more than 200 cases tied both the inferior thyroid arteries at one sitting and have never seen a trace of tetany. Neither have I found this condition in the numerous cases, in which I have simultaneously ligated three arteries, or when ligating the two inferiors, one superior and the front branch of the other superior thyroid artery. We can therefore say that tetany is not the result of the ligature itself but the result of a ligature improperly applied.

The third organ demanding protection is

the sympathetic nerve. Hitherto it has received but little attention and many surgeons have severed it with therapeutic intent in cases of Graves disease without considering the far from pleasant consequences of a sympathetic paralysis especially the consequences of a sympathetic ptosis and miosis. Just the last named symptoms demonstrate the desirability of shielding the sympathicus especially when Graves disease is not the cause of the goiter. In such cases nothing could justify a lesion to the nerve. Our investigations show that the sympathetic nerve is somewhat more endangered by our method of ligation than by the older method. Certainly more exact investigations on injuries to the sympathetic nerve in the course of other methods of goiter operation are lacking. It is principally in danger of being crushed by the retractor used to draw the carotid outward. Among the 250 cases we subsequently examined there was only one of decided sympathetic paralysis and three with slight pareses. In several cases the nerve was defective before the operation. These figures show that the danger is not great. At my request Professor Metzner and Dr. Woelfflin have investigated the sensibility of the sympathetic nerve with regard to traumatic lesions and have found that in the case of rabbits a traction of 10 grams a minute is the maximum that can be endured without a reaction on the part of the nerve. An increase in weight of 15 to 20 grams produced regularly vascular and ocular pupillary symptoms the latter of which completely disappeared in only a few cases. Still in order to reduce even this slight danger I have constructed the retractor I employ for drawing outward the carotid artery in such a manner that it does not rest on the vertebral column with a long edge but with only two supporting knobs. Thus the risk of nerve lesion is but slight (Fig. 2 r).

We will now proceed to the ligation of the arteria thyroidea superior. On this point there exists less difference of opinion. We therefore will also treat it briefly. If only one of the superiors is to be ligated it can be done from a short transverse cut made precisely in the line of the skin folds at a level with the thyroid cartilage. If the two supe-

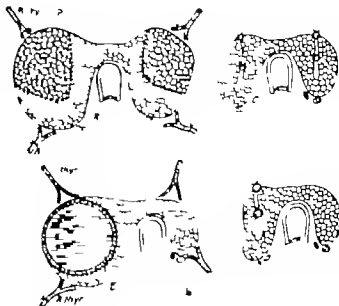


Fig. 9. Pla. of the goiter operation. 1 (also c) R. section of both lobes B on sided enucleation R recurrent nerve E epithelial bodies.

riors are to be occluded a corresponding cut is made on the other side and the operation carried out in the same manner whether it be a question of pure arterial or pole ligation. If however in addition to the superiors the inferiors and the goiter itself are to be included in the operation all can be done as Tavel was the first to prove ligation of superior and inferior arteries lobectomy etc. from the usual collar incision. The entry this incision provides is ample for the ligation of the superiors if only the upper skin flap is drawn sufficiently high upward and the small muscles retracted outward and upward (Fig. 6). As a rule it is quite unnecessary to luxate the goiter before applying the ligatures. On the contrary we generally ligate the superior thyroid arteries before dislocating the goiter whether we restrict ourselves to ligatures or undertake further intervention (Fig. 6).

The question now arises as to how many arteries should and may be ligated. That depends entirely upon the object in view. If a diffuse goiter or more particularly a goiter caused by Graves disease is to be treated with ligation only the surgeon should not be too timid. Ligatures applied to only two arteries whichever they may be do not seem to me sufficient to attain a lasting effect, even if the primary result appears satisfactory.

For that reason I always ligate preferably at one operation more rarely at two three to three and one half arteries i.e. all the thyroid arteries with the exception of one superior or the posterior branch of one. This operation if properly carried out, will by no means interfere with the function of the parathyroids. According to the results of different surgeons their function does not appear to have suffered even after the occlusion of all four thyroid arteries (Rogers). Still, for my part, I have until now preferred to confine my ligatures to three and one half arteries. We know for certain that ligation is only efficacious in cases of diffuse, and especially of extremely vascular goiters, and is even then not to be completely depended on. My later examinations of patients operated on have convinced me that only small diffuse goiters recede sufficiently. Medium sized goiters certainly do shrink a good deal they cannot, however be reduced by ligation alone to anything like the ordinary volume of a normal thyroid gland. The collateral circulation between the thyroid gland and its neighboring organs is, in spite of the absence of a more extensive arterial communication so plentiful that the gland remains viable even after the occlusion of all four arteries, if only it is not too radically separated from the surrounding structures. Experiments on animals have also proved this fact.

In conclusion we have to consider the value of ligation in the various goiter operations. We have employed it extensively in our surgical practice and are more and more convinced as to its advantages. It is understood that many operations especially enucleation can also be easily performed without preliminary ligation. It has, in fact, been laid down as an axiom that enucleation should be undertaken without preliminary ligation so as to preserve as much healthy gland tissue as possible. This conception originated in an undervaluation of the advantages of preliminary hæmorrhage, and especially in an undervaluation of the importance of the collateral circulation as a source of nourishment for the thyroid gland.

Now we know that the supply of blood to the remaining tissue of a thyroid lobe operated on is not endangered by the ligation of an inferior if only the posterior branch of a superior is left intact, and if we do not unnecessarily sever the isthmus with its border arteries. Our subsequent examinations of cases operated on have indeed proved that the preservation of the isthmus (Fig. 9) provided this organ is not decidedly diseased in no way impairs the result of the operation. Therefore in the 250 cases reported in our statistics we did not once completely sever the isthmus. In only 29 cases, in which it was in an advanced goitrous condition, did we partially remove it. By the preliminary ligation of an inferior — this is generally the more important artery — enucleation becomes a much less sanguinary a clearer and a neater operation. At the same time we can avoid hasty clamping and too extensive pouch sutures when surprised by unexpected deep hæmorrhage both of which steps mean grave risk for the recurrent nerve. If both lobes contain larger nodules the preliminary ligation of both the inferior arteries permit us to shell out neatly the largest nodules from both lobes, instead of restricting the operation to the more simple, but less logical excision of one whole lobe which always places the surgeon in a quandary if later he is called on to intervene further in consequence of the disturbance caused by the goitrous condition of the other lobe.

The foregoing remarks apply still more particularly to the operation of diffuse colloid goiters. The ideal method is then reduction of both lobes by means of resection which can be achieved without unnecessary loss of blood only by preliminarily ligating arteries on both sides. Then again it is better to ligate the inferiors, so as not to risk injuring the recurrent laryngeal nerve. If the inferiors and the anterior branches of the superiors are ligated on both sides the operation can in most cases, be performed calmly and without hæmorrhage and an adequate supply of blood is insured for the remaining thyroid tissue and the parathyroid glandules.

THE RELATION OF ARTERIOSCLEROSIS AND OTHER ANATOMICAL CHANGES OF OLD AGE TO THE DEVELOPMENT OF EPITHELIAL MALIGNANCY¹

A STUDY OF 206 CASES OF CARCINOMATA
BY FRANK WARNER M.D. F.A.C.S. COLUMBUS, OHIO

IN treating of the so-called precancerous conditions, various authors have presented us with an amazing amount of literature during the past decade. As a result of these studies one practical result has followed. The surgeon has been enabled to see and treat his cancer patients much earlier than before. Less mutilation has followed these earlier operations and many lives have been saved that before would have been lost.

Bloodgood² and others have presented the clinical picture of those breasts whose epithelial cells are about to take on or recently have taken on an abnormal growth. He has given the surgeon a very tangible and useful description by which he may recognize those conditions of the lip which if not promptly and radically treated will destroy the patient's life.

From a histological study of these precancerous conditions a number of research workers, including Greenough and Hartwell,³ Speese,⁴ Klotz,⁵ MacCarty,⁶ Means and Forman,⁷ have confirmed this work of Bloodgood and are agreed that the essential anatomical changes in these conditions are—

1. Increased activity on the part of the epithelium.
2. Increase in the connective tissue especially in the amount of intercellular substances elaborated.
3. And lastly an obliteration of the lumen of the blood vessels.

It is to be noted that a majority of the workers have been intent upon a search for landmarks by which the surgical pathologist might recognize the malignant change before

actual penetration and infiltration had taken place. Some of them however have attempted to submit theories to explain how these anatomic changes might so disturb nutrition as to become factors in the production of carcinoma.

In a study of the only cancers which have been produced experimentally Wyss⁸ and Wilbach⁹ are agreed that such cancers are the result of altered nutrition and this in turn is dependent upon a narrowing or obliteration of the lumen of the subepithelial blood vessels supplying a certain group of cells. This condition follows X-ray burns.

Thalheide¹⁰ has placed great stress upon certain old age conditions as causative factors in the production of carcinoma.

Chief among these old age conditions having an etiological role he places endarteritis. He says: "When organs which have been invaded by cancer are examined one usually finds in the connective tissue about the growth very few cells, blood vessels which are stenosed and with thickened walls and signs of endarteritis obliterans. An exception to this is noted however in that the tissues immediately surrounding the cancer show a more or less marked reactive hyperemia with cell infiltration usually of slight degree."

I drew the conclusion from these and many similar observations that the local disposition of aging tissue to cancer results from a diminution of the cellular elements and a contraction of the blood vessels in the connective tissue.

In discussing these anatomic changes which are assigned by some of these workers an etiological role in the production of carcinoma Loeb¹¹ said: "Some accuse the ob-

Bloodgood: Surg. Gynec. & Obst. 9 4, April, 9.
Greenough and Hart: Ill. J. Med. Research, xv 416.
Speese: Ann. Surg. Phila. 9 9, Feb. 3.
Klotz: Canadian M. Ass. J. 9, M.
MacCarty: Surg. Gynec. & Obst. 3, April, 4.
Means and Forman: Ohio S. M. J. 4, June.
Idem: Dental Summary 9 3, Dec.
Wyss: M. wochen med. Wochsch. 907, 177, 78.
Wilbach: The Fifth Report of the Cancer Commission of Harvard University 8.
Thalheide: Surg., Gynec. & Obst. 9 4, xix, 650.
Loeb: J. Am. M. Ass. 9 9, Sept.

literation of the blood-vessels this condition it was argued forced the epithelial cells to obtain their food supply from the connective tissue cells which latter process was said to act in a similar manner as the penetration of a spermatozoon into an ovum a somewhat fantastic comparison with barely any foundation of fact.

Others assumed, he continues, that chronic connective-tissue changes liberated the latent energy of the epidermis. It is, however difficult to see why very dense connective tissue should as such be favorable to epithelial growth. In all probability he concludes, it would prove very resistant to the expansion of the epithelium. He dismisses the etiological importance of this fibrosis with the observation that in many cases of cancer of the skin no such changes are found.

With this variation of opinion in mind it would seem desirable to take as large a number of carcinomata as time would permit and study them to ascertain whether these anatomic changes were at all a constant accompaniment of cancer. This is such a study based upon the examination of 206 cases of carcinoma. Their distribution can be seen in the appended table (see Table I).

Since most of the workers mentioned above have concerned themselves with carcinoma of the skin the epidermoid type will be considered first. The histological study of the condition of the tissues involved in the epidermoid carcinomata revealed in many instances a distinct stenosis of the lumen of the arteries supplying the part, and frequently a like condition in the smaller vessels. In this study consideration has been given only to those cases in which the arterial changes have produced a stenosis of such pronounced type as would indicate that it probably antedated the development of the cancer and of such a degree as to be capable of interfering materially with the nutrition of the area involved.

The percentage of cases in which these anatomic changes were present varies with different sites studied. Whether these figures would hold if a larger series were examined is somewhat doubtful.

Seventy six epidermoid carcinomata occurring in various parts of the body were examined. Of these 76 cases, 44 or 57 per cent, showed a distinct obliterative change in the lumen of the arteries. The connective tissue surrounding 47 cancers, 61.57 per cent of this series was characterized by the presence of few nuclei and a rather large amount of intercellular substance. There was a marked lymphocytic infiltration present in 57 or 73.68 per cent, of the specimens.

While this series is not a large one yet it does show one thing namely that the anatomic changes (obliteration of blood vessels and fibrosis) are not constant in epidermoid carcinomata. It would therefore not appear safe to place too great stress upon their etiologic role in the production of this type of carcinoma.

Since arterial changes are known to occur so frequently in the uterus, it seemed best to examine a series of non-cancerous cervixes from patients of the cancerous age as a control. Twenty specimens from women over 35 which had been removed because of erosions or scars were studied.

Of the 20 cases examined, 8 or 40 per cent, presented endarteritis leaving 12 or 60 per cent, normal vessels. Nine or 45 per cent had an acellular stroma, 3 of these with connective tissue increase and 6 with fibrosis. Four or 20 per cent were infiltrated with lymphocytes.

If this control series is compared with the cancers of the cervix it will be found that 79 per cent had sclerosed vessels in the cervixes and 40 per cent in the non-cancerous cervixes, an acellular stroma in 50 per cent of cancers, and 45 in the non-cancerous cases, a lymphocytic infiltration of 79 per cent in the cancers and 20 per cent in the benign cervixes.

HAIR MATRIX CARCINOMATA

Thirteen hair matrix carcinomata were studied. Eleven of these cases were from the face on or above the upper lip which is quite characteristic of this form of cancer. Occasionally they do arise in other parts of the body as in these cases one was from the region over the scapula, and another from leg.

TABLE I

Epithelial carcinoma				
Hair	3	2	1	0
Sebaceous	1	2	1	0
Overlaid	1	2	1	0
Face	1	2	1	0
Trunk	1	2	1	0
Upper	1	2	1	0
Lower	1	2	1	0
Extremities	1	2	1	0
Total				
Hair	3	2	1	0
Sebaceous	1	2	1	0
Overlaid	1	2	1	0
Face	1	2	1	0
Trunk	1	2	1	0
Upper	1	2	1	0
Lower	1	2	1	0
Extremities	1	2	1	0
Total				
Hair	3	2	1	0
Sebaceous	1	2	1	0
Overlaid	1	2	1	0
Face	1	2	1	0
Trunk	1	2	1	0
Upper	1	2	1	0
Lower	1	2	1	0
Extremities	1	2	1	0
Total				

This type of cancer arises at the hair follicles from the epithelial cells of the hair follicle. In their growth, tumor cells of this type tend to differentiate as do the cells of the hair matrix and form the characteristic nodule.

They also tend to form tubules as would be expected from their origin. The cells themselves are frequently spindle celled or tuboidal and often appear in a rather compact arrangement.

Hair matrix carcinomata seldom invade the deeper structures and so are perhaps less malignant than any other type of carcinoma. It removed by a rather wide incision they are not likely to recur. This is shown by two of my own cases in this series one of which was removed some five years ago and the other two years without sign of recurrence in either instance.

In the examination of this group of 13 hair matrix carcinomata 10 of the cases showed a dense connective tissue beneath the epithelium and surrounding the hair follicles which was poor in nuclei and rich in intercellular substances. Arterial tenosis was noted in only 3 or 38.5 per cent instances.

in the breast tissue.

THE BREAST

Five cases of breast cancer were examined. In 3 the cancer was of the ductal type and in 2 the cancer was of the lobular type. In all cases the cancer was of the ductal type and in 2 the cancer was of the lobular type.

In the breast tissue the cancer seems to possess the power of stimulating the growth of connective tissue even to a marked extent in the benign tumors the so-called fibroadenoma. In the malignant cases it was not surprising to find connective tissue increase in all of these cancers except the most cellular and rapidly growing ones. Out of the entire group of 5 cancers of the breast there were but 4 those of a medullary type that did not show fibrotic changes.

In a control series of 10 specimens of abnormal involution of the breast only 3 cases, 30 per cent, presented arterial sclerosis change and 16 or 60 per cent with infiltration of lymphocytes.

All of the control series exhibited fibrosis. This is a part of the histologic picture of an involuting breast.

From the fact that cancer of the breast is so frequently associated with abnormally involuting breasts many clinicians and pathologists have come to regard this state of the gland as a precancerous condition requiring removal of the organ.

The vascular changes in the cancers were 58 per cent compared with 25 per cent of sclerosed arteries in the non-cancerous specimens, and there was infiltration of lymphocytes in only 16.66 per cent, cases in the controls.

In studying the specimens of abnormal involution of the breast with reference to the anatomic changes of endarteritis, fibrosis and epithelial proliferation, it was found that the acini were not only increased in number but frequently the fibrotic changes were so marked that their secondary contraction had occluded the ducts, resulting in a formation of cysts, which has given rise to the more common term of chronic cystic mastitis.

Often the acini and ducts were filled with proliferating cells but by carefully examining the surrounding connective tissue, it was plain that there had been no infiltration with epithelium. Not alone that, but the acini although greatly increased in number were more uniform in size than when the breast had taken on a malignant type of growth.

ADENOCARCINOMA OF THE UTERUS

A series of 8 cases of adenocarcinoma of the body of the uterus were examined. Five cases, 62.5 per cent, presented arterial obstructive changes; 2.5 per cent, were acellular; 3.375 per cent, had been infiltrated with lymphocytes.

A study of nine cases of non-malignant uteri of the cancerous age was made. The uteri had been removed for various reasons other than cancer. Three 33.3 per cent, presented sclerotic vessels; one 11.1 per cent, gave an acellular connective tissue, but there was no lymphocytic infiltration in any of the 9 cases.

As will be noticed from this series the percentage of vessels sclerosed was less than in the preceding cancerous series of uteri, although there they were involved in a little more than half of the cases. The same obser-

vation is true with reference to the condition of the connective tissue in the region of the carcinoma.

THE PROSTATE GLAND

Twelve cases of cancer of the prostate were examined. Four 33.33 per cent, of these specimens had been attacked by arteriosclerosis and 3.25 per cent showed the connective tissue to have been increased in amount and exhibiting few nuclei. Lymphocytic infiltration was present in 9 cases 75 per cent.

McGrath¹ has called attention to the analogy which exists between the microscopical pictures of the epithelial changes in the cancerous process of the breast and prostate. While this study does not assign much etiologic role to vascular stenosis, it leads to an agreement with McGrath as to the nature of the process in both of the organs mentioned. Whatever stimulus initiates the process, it passes through a gradation of epithelial hyperplasia which is often easily followed in a single case. Frequently the various steps may be seen in the same slide. Acini are seen in which both the inner and outer layers of cells are distinct (the primary hyperplasia of MacCarty). Other areas of acini exhibit a piling up with epithelial cells by a proliferation (secondary hyperplasia) and finally areas are found in which the epithelium has broken through and is infiltrating the surrounding tissue (tertiary hyperplasia).

CONTROL SERIES OF HYPERTROPHIED PROSTATES

Ten cases of hypertrophied prostates were examined. The average age of these patients was 60.7 years. Seven of the prostates were cystic in type. But one of the cases showed obstructive sclerotic changes in the vessels. Hyaline degeneration was manifest in a number of the arteries of the specimens. Two of the prostates, 20 per cent showed acellular connective tissue increased in amount. Six, 60 per cent, presented lymphocytic infiltration.

By a comparison of the hypertrophied with the carcinomatous prostates studied, one finds 10 per cent of the former with sclerosed

vessels while the latter shows 33 per cent with arterial obstructive changes

In the hypertrophies 20 per cent showed connective tissue increase of an acellular type while 25 per cent of the cancers of the same organ showed a like fibrotic change. Lymphocytic infiltration was present in 60 per cent of the hypertrophies and 75 per cent of the cancerous prostates

If obstructive endarteritis is one of the occasionally contributing factors in the development of cancer it was absent in 8 cases 66.66 per cent which had normal vessels out of the 12 specimens examined. The same holds true of the cancerous prostates in which fibrotic changes were present for 75 per cent of them presented a normal connective tissue

CARCINOMA OF THE OVARY

A series of 10 carcinomata of the ovary were examined. Three or 30 per cent showed vascular changes of an obstructive character. But 1 or 10 per cent presented acellular fibrotic changes in the connective tissue. Lymphocytic infiltration was present in 3 of the cases 30 per cent.

A peculiar feature of this series was the large percentage 70 per cent, of cases with normal blood vessels. Another notable fact was the absence of fibrotic changes in the ovary except in a single case of the series. These facts stand out with increased force when we come to reflect that it is a very common thing to find ovaries removed for other causes in the so-called cancerous age permeated with sclerosed vessels also to find frequently fibrotic changes in these organs. But here are 7 out of 10 cases with normal vessels in the presence of cancer and only 1 with fibrotic change while there are numberless cases of ovaries with sclerosed vessels and fibrotic changes without carcinoma. The type of the tumor might influence the findings somewhat, as 7 of these were papillary cystadenomata

CARCINOMA OF THE STOMACH

Seventeen cases of carcinoma of the stomach were examined. Six or 35.52 per cent presented sclerotic arteries a very low per

centage compared with what obtained in carcinoma of the cervix uteri. Four 23.52 per cent showed lymphocytic infiltration which is small compared with some other localities. Four gave an acellular connective tissue increased in amount 23.52 per cent.

A very interesting question in regard to these cancers is whether they develop from preceding ulcers of the stomach or the ulcer develops from the carcinoma. By analogy we should expect to see a carcinoma develop from the fibrous tissue about an ulcer just as a cancer frequently develops from the fibrous tissue of an involuting breast and from the dense tissue following X-ray burns. We are all familiar with Mayo's views that cancer frequently develops from an ulcer. Upon the other hand Stromeyer thinks the majority of these ulcers associated with carcinoma have been entirely secondary to the cancer and have been superimposed upon it (Figs 9 and 10).

The small series of twelve cases of adenocarcinoma of the intestinal tract other than the stomach were examined. Eight 67 per cent showed arterial obstructive changes 5 4 57 per cent a fibrotic change and 3 25 57 per cent lymphocytic infiltration. One of the specimens was from the œsophagus two from the ileum and three from the colon. Of the 6 cases of the rectum included in the above series there were 50 per cent with arterial changes one fibrotic and 2 with lymphocytic infiltration. In 5 of the cases of this series the cancer-cells had shown their ability to stimulate the connective tissue overgrowth to an extent that had resulted in an almost complete obstruction of the alimentary tract when this excessive tissue underwent contraction for whenever newly formed connective tissue in a circular tube undergoes contraction as it will stricture results. But this is a feature that is outside the discussion of this study of the etiology of cancer.

PRIMARY CARCINOMA OF THE LIVER

Four cases of primary carcinoma of the liver were examined. But one of these cases showed arterial alteration of its coats and no fibrotic changes were present in any of them.

The rarity of the occurrence of primary carcinoma of the liver renders these cases of especial interest. This is the more true, since there has been so much written concerning the relation of cirrhosis to primary cancer of the liver. Many authors have emphasized the presence of cirrhosis in this type of cancer in a large percentage of the cases reported.

Winternitz,¹ after quoting a number of writers who had presented tables showing the large number of carcinomata which had been associated with cirrhosis says: "This table is of interest, since it points out first what a large number of cases of cancer of the liver are associated with cirrhosis and secondly the tumor may occur in normal and diseased livers. In a tremendous percentage of cases the liver presents an ordinary type of cirrhosis."

It is generally agreed that the cirrhosis precedes the neoplastic formation where these two are associated. The tumor however brings about pressure atrophy directly and necrosis of the hepatic parenchyma through its excessive vascular involvement, and in this way a fibrosis may result secondary to the tumor growth. This is important since in a few cases those areas of liver uninvolved by tumor growth are likewise free of cirrhosis. Whether a cirrhosis may develop secondary to the tumor growth is uncertain but there is no doubt that the cirrhotic process is exaggerated as a result of this. That cirrhosis is more frequently associated with cancers arising from the liver-cells than with those arising from the duct epithelium.

In the series of 4 cases studied by me the cancer arose in 2 cases from the epithelium of the bile-ducts, and in 2 cases from the liver-cell epithelium. There was no cirrhosis in any of the cases. In one of the patients, 9 years old he was too young of course to have developed cirrhosis from the usual causes.

So whatever may be the cause of primary carcinoma of the liver neither vascular changes nor fibrosis could be charged as a causative factor in these 4 cases.

PRIMARY CARCINOMA OF THE LUNGS

The very respectable series of 4 cases of primary carcinoma of the lungs were examined. Owing to the rarity of the trouble, or seeming rarity I felt I was fortunate in finding 4 cases put at my disposal for study in the Laboratory of Pathology of the Ohio State University. A report of these cases has already been prepared for publication.

None of these cases had any vascular changes nor lymphocytic infiltration. But one of them was associated with fibrosis. This one was an epidermoid carcinoma, apparently taking its origin from the bronchial mucous membrane.

An interesting question at once arose as to how squamous epithelium forming the cancer could come from the ciliated cylindrical epithelium of the mucous membrane lining the bronchial tubes. The answer comes from the belief in the metaplasia of one type of cell of a tissue into another type of the same tissue.

Virchow in 1854, propounded the theory of the metaplasia of cells of any type into cells of other types. Metaplasia occurs only within certain limits. Epithelial tissue can be converted into other forms of epithelial tissue one form of mesoblast into another form of mesoblastic tissue.

Adler in his monograph says: "The transformation of one sort of epithelium into another usually of cylindrical or cuboid epithelium into squamous epithelium as has been found in many kinds of inflammatory processes" is well known.

The theory of persisting and abnormally dispersed germinal centers and remnants while it cannot be disproved, is not necessary for the explanation of the so-called metaplastic transformations.

Haythorn observes: "During the study of a case of unresolved pneumonia, one field was found which contained two medium-sized bronchi, the mucosa of which was replaced by granulation tissue covered by stratified squamous epithelium. Then as many as twelve bronchi were found which showed a like condition. He concludes: 'Our find-

M. C. Winternitz. Primary carcinoma of the liver. Johns Hopkins Hosp. Reports, N. 5 No.

Adler. Primary Malignant Growth of the Lungs. Trans. R. Med. Soc. J. Med. Research. 41 p. 513.

ing in a measure agree with Schridde's idea in so far as they show that the metaplastic cells are newly formed cells and that they come from the growing layer. They seem to contradict the necessity of the presence of embryonic rest as they could hardly have been so numerous and simultaneously to set up the process in several different bronchi.

Of the 4 cases of primary carcinoma of the lungs examined by me, 3 were upon the right side and 1 upon the left.

One of these cases, No. 60, is an epidermoid carcinoma of the lung was in a man 60 years old who had been a very heavy smoker of the strongest tobacco. He had worked in a melting work where he inhaled very strong fumes of irritating gases. The clinical history of his case was one of tuberculosis without however ever having found tubercle bacilli which had been sought for some fifteen different times. The point of interest in this case so far as it concerns this study are the history of irritation over a long time, presence of a distinctly fibrous condition of the lung attacked and the metaplasia of the tumor cell into a squamous type.

From the fact that this case was diagnosed as I understand as tuberculosis of the lung clinically, it is done in most cases of cancer of this organ it may prove on more careful pathological study after death that primary cancer of the lungs is not so rare a disease as is now thought to be. We know already that some cases of cancer of the lungs are mistaken for sarcoma or that organ.



Fig. 1. A thickened artery in an epidermoid carcinoma of the lung.

OBSERVATION ON LYMPHATIC INFILTRATION

Different workers ascribe a protective influence to the presence of lymphocytic infiltration. It is believed their tendency is to inhibit the new epithelial invasion. Their habers above quoted refer to Fitch's experiment on the behavior of cancer development in mice after bleeding them which it was claimed stimulated the blood-forming organ to an extent that increased the resistance to cancer after inoculation. Their habers lay great stress upon doing many things that stimulate the blood-forming organ to prevent the recurrence of cancer after operation because he feels that poor blood supply to a part is a causative factor of the disease.



Fig. 1. A thickened artery in an epidermoid carcinoma of the cheek.



Fig. 2. An early epidermoid carcinoma of the cheek with lymphocytic infiltration.



Fig. 3. Thickened skin epidermis in an epidermoid carcinoma. Lymphocytic infiltration around a tumor cell.



Fig. 5. Normal vessels in the cervix uteri from organ of the cancerous age.



Fig. 6. Adenocarcinoma of the terina lumina of vessels patent rich lymphocytic infiltration.



Fig. 7. Thickened artery from the terina of organ of the cancerous age.

not alone that, but also that there is a predisposition to cancer which is partly overcome by this increased blood formation and activity produced by bleeding Biers hyperræmic treatment and the injection of certain glands as the thymus the spleen and the uterus which he claims results in producing a leucocytosis that is detrimental to epithelial penetration. This is in keeping with the experiments of Loeb on the development of cancer in mice under varying influences of internal secretions. He says: "It appears probable that with the co-operation of hereditary conditions all those internal secretions are factors in the origin of cancer which initiate or sustain continuous or periodic growth processes. In other cases mechanical stimulation of growth may take the place of chemical stimulation and again in others a combination of both may be present."

These two sets of factors are sufficiently strong to determine to a great extent the frequency of cancer in mice.

Bearing upon the importance of lymphocytes as a protective influence against the development of sarcoma in rats which coincides with similar conclusions reached upon lymphocytes in cancer by Fischers quoted above Murphy has conducted some interesting experiments on the heteroplastic tissue grafting on rats from a mouse sarcoma. He found that in 10 rats which had been subjected to the influence of X rays for a

certain time sufficient to destroy the lymphatic leucocytes the tumor grew. On the contrary when the grafting of the same sarcoma was undertaken in 10 normal rats no permanent growth took place.

Dr. James B. Murphy and John J. Norton of the Rockefeller Institute made some very interesting experiments on spontaneous mouse tumors. He removed these tumors from 32 mice. He then placed these tumors aside for the moment and subjected the animal operated on to a regulated dosage of X ray treatment that was known to stimulate growth of the lymphocytes. Then the tumors were replaced in the animals in another position. The result was that 50 per cent of the tumors grew slowly and 50 per cent failed. There were 2 per cent of recurrences in the old sites of the tumor.

The next experiment was on two control series of mice likewise affected.

First control: Twenty nine tumors were removed from as many mice and returned into the same animals only in another region without any treatment of the animal or the tumor. 96 per cent of the tumors grew and 48 per cent recurred in the old site.

Second control: Ten spontaneous tumors were removed from mice and the tumors subjected to a similar dosage of X rays as the original experiment. The tumors were then returned into the groin of the animals. The result was 100 per cent of growths and 40 per cent recurrences in the old site.

Leo Loeb, Science, vol. 21, p. 475, 14.

James B. Murphy, M.D., Rockefeller Institute Report, 1917, p. 1479.

Science, vol. 44, 2.

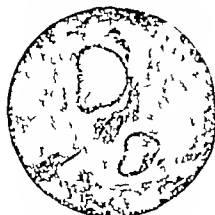


Fig. 8. A thickened artery from carcinoma of the prostate gland.



Fig. 9. Thickened gallbladder mucosa with cancer cells infiltrating the floor of the ulcer.



Fig. 10. Thickened artery with carcinoma of the heart.

SUMMARY

1. I have not found the various old age conditions of endarteritis, acellular connective tissue or fibrosis to have been present in all cases of cancer examined.

2. In the study of the various abnormal conditions present in my control series of non-malignant uteri, sclerosed vessels were found without carcinoma.

3. Many uteri with normal vessels showed the presence of cancer-cell infiltration.

4. Many cancerous uteri had only normal connective tissue consequently without fibrosis.

5. Inasmuch as so many of the non-cancerous uteri showed the so-called old age conditions, one would expect to find cancer in them more frequently if they are a positive factor in the development of cancer.

6. The same may be said of the ovary, where it is quite common to find sclerotic changes in the vessels and fibrosis in the stroma in the cancer without the patient having developed cancer.

7. Certain precancerous conditions do not necessarily develop into cancer. This is notably true in smokers' burns, some of which heal though simulating cancer. The epithelium in these cases simply piles up without infiltrating the tissue beneath.

8. Lymphocytic infiltration, even when present, varied greatly in amount. This was true not alone of the cancers but also of the various tissues used as controls; in some cases being very pronounced in others quite light

in amount. It was especially marked in the rapidly growing carcinomata.

CONCLUSIONS

1. Of the 206 cases of carcinoma of all organs and regions examined, 103 showed arterial obstructive changes. This gives us substantially an equal division between endarteritis, 50.06 per cent, and normal vessel.

2. Fibrotic changes were present in 116 cases, 57 per cent.

3. Lymphocytic infiltration was present in 85 cases, 57 per cent.

4. That endarteritis and the anatomical changes of old age cannot be looked upon as a constant factor in the production of cancer is shown by the fact that normal vessels were present in almost half the cases.

5. The same holds true of fibrosis or even acellular connective tissue without fibrosis.

6. Lymphocytic infiltration, while present in less than half of the cases, plays a role that is protective rather than etiological.

7. That certain biochemical factors of a local or internal and general type are probably responsible for some cases of cancer.

This study was made in the Pathological Laboratory of the Medical Department of the Ohio State University through the courtesy of Dr. Ernest Scott, Professor of Pathology. Dr. Jonathan Forman, Instructor of Pathology, was my constant associate in carrying on this study. Mr. Carl Hugger, Assistant in the Department, made the photomicrograph. To all of these I am deeply grateful.

RUPTURE OF THE GALL-BLADDER

ITS CAUSE PREVENTION AND TREATMENT

BY W. W. GRANT, M.D., DENVER, COLO. DO.

WELL authenticated cases of rupture of the gall bladder from pathological conditions are few and deserve always the consideration of surgeons and internists.

Traumatism to the abdominal wall may well excite rupture of a distended diseased gall-bladder just as a similar blow to the lower quadrant might well aggravate a diseased condition of the appendix or a cystic growth, promoting or causing perforation.

The usual condition predisposing to and causing perforation is an infection of the bladder usually of long standing. The acute phlegmonous condition is in itself not primary but secondary to a mild, but steadily progressive pathological condition from micro-organisms, usually the colon and typhoid bacilli and streptococci, finally resulting in gangrene.

The progress and course is similar to that of the appendix, but not so rapid. Gall stones will generally be found in these aggravated cases which result in gangrene and empyema.

These conditions are the result of ignorance, neglect, and delay. The internist may not have appreciated the importance and significance of a clinical history; consequently the surgeon has not had an early opportunity to relieve the condition by operation.

Prevention of infection must depend primarily upon healthy dietetic and living conditions and adequate elimination of intestinal toxins. Typhoid fever predisposes to gall bladder as it does to appendiceal infection.

Prevention of perforation or rupture must depend upon early operation. If this had been the rule in the past fifteen or twenty years, we would hear less now of cholecystectomy which is fast becoming a fad.

Every novitiate and many who are not, seems to feel that he is not up-to-date unless in the swim of the latest surgical innovations. These innovations, in the realm

of the unknown but safely experimental fields, appeal strongly not alone to the progressive surgeon but more to that class of surgeons and physicians who pay in cash for business and are not much concerned about the pathological conditions.

Past experience should inculcate lessons of value and of wisdom as in the popular and much abused operation of gastro-enterostomy for real and doubtful ulcers of the stomach and duodenum, and quite regardless of the important question of pyloric stenosis—the one condition demanding operation that admits of no debate.

I may be pardoned for introducing reports of two cases which are worthy of comment, if not also of record.

CASE. J. C. M., aged 5, farmer by occupation, was operated on in 1903 for gall-stones—several being removed. The gall bladder was drained and the wound or fistulous tract discharged bile for nearly a year before completely healing. The patient remained quite well until the spring of 1904 when stomach dyspepsia recurred. This gradually increased until the night of October 2, 1904, when acute symptoms of perforation attended with severe pain, chill, and fever were suddenly manifested. I saw the patient next morning and operated immediately. It was disclosed that in the former operation, the fundus of the bladder was sutured to the abdominal peritoneum, which was a common procedure at that time, but now justly abandoned.

There was a rupture in the fundus and extravasation of small quantity of pus but limited by omental adhesions. There was no general peritonitis. A smooth round stone as large as a large pecan nut was removed and probably as a small stone was overlooked in the previous operation. It was lodged in dilated cystic duct and without difficulty removed through the bladder.

The bladder except a small part at the seat of perforation was not gangrenous. This was resected with a small piece of omentum and the bladder pouched and drained. The wound healed perfectly in no month and the patient has been perfectly well since. He had no jaundice. The unsatisfactory progress after the previous operation was doubtless due to the presence of the stone removed in the second operation.



Fig. 1. Gall bladder showing point of rupture.

It might be asked why the gall bladder was not removed in such a case. I would answer that in the absence of thickened rigid gangrenous wall there is no necessity for its removal but some good reasons why it should not be. Even killful urgeon overlook the presence of small stones in the bile ducts. What happens in such cases when the bladder is removed. The stone is too large to pass the ampulla or papilla. A second operation sooner or later becomes a necessity. Every surgeon recognizes the increased difficulties if not danger also of secondary operation on the ducts due to adhesions and the destruction of natural guides and landmarks. It is furthermore easier and safer to drain the gall bladder than it is the ducts. There is another objection to cholecystectomy. Interstitial pancreatitis is believed to be due to infection from the bile passages and the most effective treatment of such cases is drainage through the gall bladder. If the gall bladder is removed the matter is needlessly complicated and the treatment more doubtful and difficult.

If not the presence of the gall bladder as a receptacle and temporary reservoir for the bile worthy of consideration as serving some useful purpose.

If the infection is easily remediable by a less radical procedure then it seems to me that cholecystotomy should be the operation of choice. It should be remembered



Fig. 2. Reverse side of the specimen (Fig. 1) showing the substance of the liver.

that cholecystomy does not remove the constitutional diathesis and intestinal toxæmia which exist in infections and gall stone disease.

CASE. Mrs. M. widow, aged 52, living in comfortable circumstances. She had occasional attacks of gall stone she bore several years which had increased in frequency and severity during the year 1915. On the fourth day of last January she consulted me as to her condition. I urgently advised immediate operation as the character and acuteness of the attacks of colic with local manifestations of disease indicated impending danger from perforation and sepsis. She positively and abruptly declined consideration of an operation. On January 11 she sent for me at night. She had been suffering severely all day and evening from a violent and persistent attack of colic. She was vomiting frequently. The abdomen was generally distended and the walls rigid. Notwithstanding my decided opinion that she was suffering from general septic peritonitis due to perforation of the gall bladder she refused to go to the hospital or to submit to operation. In three days she died from septic peritonitis and paralytic ileus.

I made a post mortem which revealed some omental adhesion and a pint of extravasated bile in the right kidney fossa. There was no pus in it and none in the small gall bladder which was contracted around a single round stone the size of a large olive.

I removed with the gall bladder a portion of the attached liver tissue.

Examination showed a small gangrenous area half an inch long and one fourth inch wide with a perforation of the diameter of a slate pencil (indicated by arrow in the photograph picture Fig. 1). On the reverse side of the specimen (Fig. 2) in the substance of the liver will be seen a light colored and firm stone the size of a small pecan nut. This might not have caused trouble and would not have been discovered or suspected in an operation. It was probably in a branch of the hepatic duct.

This patient's life was a needless sacrifice in refusing operation before the last attack and declining the only chance in the beginning of the fatal illness.

There could be no doubt as to the diagnosis and the necessity for operation. The very limited gangrene of the gall-bladder was doubtless due to the pressure and irritation of the stone finally resulting in ulceration and rupture.

Gall bladder infections are common and for

a long and indefinite period do not usually give rise to serious illness even in the presence of gall stones.

More consideration should be given to the early clinical history and to the conditions which predispose to infection.

The condition is curable only by operation and with early diagnosis and prompt cholecystostomy gangrene will not be seen often. The mortality will be exceedingly small without the use or necessity of cholecystectomy.

PUERPERAL GANGRENE OF THE EXTREMITIES

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PUERPERAL GANGRENE OF THE EXTREMITIES

ONE of the most serious and intractable complications of the puerperium and incidentally of pregnancy consists in puerperal gangrene affecting the lower and sometimes the upper extremities. The importance of this menace to childbearing women is plainly illustrated by the reports of 76 authentic cases in the literature, including 5 cases of gangrene after gynecological operations. The disease is however fortunately far from common. The occurrence of two instructive cases in his personal experience led the author to make a careful study of puerperal gangrene and the literature on the subject.

In view of the gravity and gloomy prognosis of the condition it seems advisable to bring the entire subject from pathogenesis to therapy to the attention of the medical profession in general and of gynecologists and obstetricians in particular. The prompt recognition of incipient gangrene is the only safeguard against a fatal issue or at best a marked mutilation of the extremities.

The author's first patient a young woman of twenty years with gangrene of the right leg following abortion recovered after amputation below the knee. The second patient died of exhaustion with dry gangrene of both feet and lower legs after labor at term.

CASE. Abortion, curette gangrene of right leg, amputation recovery.

R. R., 20 years of age, admitted to the Harlem Hospital New York on June 9, 1915. The patient was in the best of health and appeared to be an exceedingly normal and strapping young woman. The heart and lungs were normal, the menstrual history normal, the urine normal. Temperature on admission was 101° and pulse 100. *Physical examination.* Some slight bleeding from vagina, cervix adnuit, one finger uterus about three months pregnant, dense and parametria perfectly normal. *Differential diagnosis.* Threatened abortion (infection).

Shortly after admission she aborted, three months fetus. There was foul odor from the fetus as well as from the vagina. The temperature on the next day dropped to normal only to rise again on the same evening to 101° and 102°. The patient continued having a temperature between 101° and 102° for the next six days with no pains, however, and no other symptoms. On the seventh day after an examination by me it was decided to curette the patient as the uterus was still enlarged and soft. There were numerous grayish white superficial ulcers around the cervix. These ulcers were covered with a mass of whitish membranes. After the curettage by which some placental tissue was removed the whole interior of the uterus as well as the cervix was irrigated with tincture of iodine. This was repeated for the next seven days. Even after the curettage the temperature did not drop entirely but kept between 101° and 102°. On June 13, 7 days after the curette the patient began to complain of pains in the right leg and three days later that is on June 16 in 10 ten days after the curettage the right leg and foot began to swell, became cold, and showed violent bluish discoloration.



Fig. 1. Gangrene of the right leg.

tion. The pulsation of the femoral artery was not to be felt and the patient extremely painful in the thigh.

On June 5th the sensitive leg pained but the patient remained in bed. On June 6th a painful nodule appeared in the thigh. The foot was cold and numb. There was no pulsation in the radial pulse. The patient died on June 10th in the thigh.

It suddenly became known that the patient was gangrenous. It was highly swollen and black. The patient was highly sensitive with pain in the right thigh. The lungs and liver were normal. The heart was normal. The patient died on June 10th in the thigh.

The whole process became more pronounced and the line of demarcation more distinct so that on July 27, in spite of all conservative treatment, amputation had to be performed below the knee. The patient being otherwise in perfect condition recovered in due time. The heart had always been normal and several blood cultures showed no growth. Especially no hemolytic streptococci were found.

The Wassermann test was negative. The result of the histological examination was as follows. The specimen consists of the foot, one-third of the leg and the thigh. There is an ulcerated area at the external malleolus which exposes the peroneal tendons and extends over the dorsum of the foot. Section of the foot shows that the skin and superficial fascia in the plantar region are entirely necrotic. On the dorsum the

muscles are also necrotic. The patient died on June 10th in the thigh. The patient was highly sensitive with pain in the right thigh. The lungs and liver were normal. The heart was normal. The patient died on June 10th in the thigh. The patient was highly sensitive with pain in the right thigh. The lungs and liver were normal. The heart was normal. The patient died on June 10th in the thigh.

This case is of interest because so far as I could find in looking over the literature it is only the fourth case on record of gangrene following abortion. Andérodia has published the case of a right leg becoming gangrenous after an abortion in the sixth month and ending fatally. The second case published by Béguin and Andérodia occurred in a young woman in whom both legs became gangrenous and the right leg had to be amputated. Here also death occurred. In the case reported by them all findings showed that there was a vegetative endocarditis.



Fig. 1. H. Lilienthal's case. Post-operative gangrene of feet.

present. In Oke's (Simpson's) case the left hand was affected.

CASE 2. Labor at full term, forceps delivery, sloughing of perineal sutures, dry gangrene of both feet and lower legs, no operation, death, no autopsy.

L. F., 29 years old, 1-para, was admitted to the Harlem Hospital, New York, on June 10, 1905, at full term of her pregnancy in generally good condition. Her family and medical history irrelevant. Heart normal, lungs, normal, other internal organs, normal, urine at time of admission, normal, no edema present. Wassermann negative.

On day of admission the patient was delivered with medium forceps. A second degree laceration was repaired with chromic catgut sutures. Two days after confinement the patient had a temperature of $103\frac{1}{2}^{\circ}$ and slight chill. On examination it was noticed that there were some slight ulcers around the cervix for which the patient received the ordinary treatment, iodine applications and douches. The urine now showed traces of albumin and some hyaline casts. The temperature dropped to 101°

and. On the sixth day after confinement the sutures were removed because the whole area was sloughing.

Ten days after confinement the patient still had irregular temperatures running up to 103° and 104° and even on the eleventh day a temperature up to 105° . She looked like a very sick person although nothing could be detected outside of the local infection. The heart particularly seemed to be in good condition. Twelve days after confinement on June 27 the patient left the hospital against our advice only to return on July 3, that is seven days later in an acute and critical condition.

On her readmission (July 3) the heart-sounds were of good quality, heart not enlarged, but its action rapid rate. The temperature varied between 101° and 104° . The abdomen was held rigid. No distinct masses could be felt.

An examination revealed that both feet symmetrically for a distance of about four inches above the ankles, were discolored, nearly black, and the skin shrivelled. Both feet were extremely tender on touch, cold and in some places showed vesicles filled with a whitish fluid. A diagnosis of typical symmetrical dry gangrene of both feet could easily be made. At about four inches above the ankles on both sides the line of demarcation was well pronounced on July 7, but the patient's general condition did not permit of any operative interference. There was no pulsation of the femoral arteries. She finally died July 19, due to extreme exhaustion and debility. Several blood-cultures showed that there was no general sepsis. It was impossible in this case for us to get an autopsy so we can only guess at the real cause of this symmetrical gangrene.

In both of these cases we have had to deal with a puerperal infection, in the first case of a rather slight nature and in the second much more severe. In the latter case I would like to advance the following explanation of the occurrence of the symmetrical gangrene. A thrombus left the uterus and migrated into the uterine artery and from there into the internal iliac and common iliac artery up to the bifurcation of the aorta where it also occluded the other common iliac artery and by doing so caused the symmetrical gangrene on both sides. This was not the case in our first patient. As can be seen from the description, the onset of the gangrene was rather slow and the gangrene itself of the moist type. This immediately suggests an occlusion of the venous system in the affected limb with the arterial supply still working. I am inclined to believe that the complete venous obstruction was the primary incident

and that the peroneal artery became obstructed only secondarily. It would be wrong to assume that the obstruction of such a small vessel as the peroneal artery could be the only cause of the gangrene of the entire foot and lower leg. I therefore think that for reasons stated above we have to deal in this particular case with an instance of arteriovenous occlusion of the affected area, the venous obstruction being the primary affection.

The following discussion deals with gangrene due to the puerperal state and affecting the extremities. Diabetic gangrene and gangrene due to poisons (*secale cornutum* for instance) are not included irrespective of the puerperium; cases of the latter kind were not uncommon in Italy some years ago. Obstruction of non-puerperal vessels for example in the brain causing puerperal aphasia as in Sinclair's¹ patient is outside of the scope of the present consideration but it is noteworthy that the veins in the lower part of the right leg became thrombotic. Another observation which requires separate mention is that of Schulz² who referred the peripheral gangrene of his puerperal patient to post typhoid anæmia and resulting nutritional disturbances in the central nervous system. There was no evidence of thrombosis. Seidelmann³ reports a case of symmetrical gangrene of the upper extremities after pneumonia in a woman 29 years of age who about three weeks previously had been delivered of twins. As may be seen from the case histories appended to this article peripheral gangrene has frequently followed childbirth after even longer intervals in consequence of septic endocarditis and embolism so that there would seem to be sufficient reason for accepting a puerperal origin.

Raynaud's disease (as is perhaps not generally known) was observed for the first time in a young woman four months after childbirth and since that time (1862) has been reported as occasionally coincident with the puerperium. The disease as described by Raynaud is characterized by the absence of a maternal

appreciable obstacle to the course of the blood whether arterial or venous. According to the description of v. Mehring⁴ a prolonged circumscribed vascular spasm leads first to symmetric discoloration and finally to gangrene with shedding of the affected tissue areas sometimes entire phalanges. There seems to be no reason to doubt that Raynaud's disease may appear as a manifestation of syphilis as well as of other infections. Of special interest from the present viewpoint is the heading of Raynaud's case report as follows: "Local asphyxia of the feet, hands, nose, dry gangrene of the four extremities going on to the fall of many portions of the ungual phalanges, the whole supervening on a recent parturition. Recovery."

The investigations of Buerger⁵ who studied the vascular lesions leading to presenile spontaneous gangrene refer to thrombo-angitis obliterans, the endarteritis obliterans of German writers, a specific disease which must not be confused with the conditions leading to puerperal gangrene of the extremities. There is no reason for assuming that the specific type of infectious organism which he considers responsible for thrombo-angitis obliterans is identical with the pathogenic agent of puerperal gangrene, a condition in all probability due to a mixed infection. The only similarity consists in the development of certain purulent foci strongly suggesting the presence of some specific toxin or more probably some microbial agent. Buerger points out that spontaneous gangrene can occur in the presence of patent vessels and of peripheral nerves in which no significant changes can be detected. In all the examined cases of puerperal peripheral gangrene organic vascular disease was either demonstrable or the impending changes had been arrested by the rapidly fatal termination.

Etiology. Widely scattered among the many millions of births registered in civilized communities statements are recorded concerning complications on the part of the vascular system in form of puerperal gangrene.

Lancet, Lond. 20 July 1862.
Mitt. d. med. Abt. d. Herz. K. Universitäts zu Breslau.
Deutsche Arch. f. klin. med. 34, LIV, 86.
Deutsche Zeitsch. f. Nervenh. 60, 1, xxv.

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M. Raynaud: Local Asphyxia and Symmetrical Gangrene of the Extremities. Translated by D. Barlow. Selected Monographs, published by Sydenham Society 188 p. 75.
J. M. Roserch, 5 vol. 8. Am. J. M. Sc. 5, 5, 611, 6.

of the extremities. Different types of vascular obstruction in form of arterial venous or arteriovenous blocking with or without changes of the heart valves, may all culminate in the clinical picture of gangrene. Puerperal thrombosis was found in 76 of 34951 cases (0.22 per cent) by Klein¹ 25 cases being frankly due to infection alone. Fatal embolism occurred in 4 cases (0.01 per cent). In other words there was one thrombosis in five hundred births and one embolism in nine thousand births. Jaschke² mentions one thrombosis in four hundred births and one embolism in nine thousand births. A very important cause of origin of thrombi is a considerable loss of blood whether due to parturition, operations or other reasons. An abnormal constitution of the blood favoring the onset of thrombosis was described under the name of *thrombophilia* by Mendel.³

Peripheral puerperal gangrene of venous origin is very exceptional although diseases of the veins of the genital apparatus in form of varicose and thrombotic veins are of common occurrence during pregnancy as well as in women who have borne a large number of children. Phlegmasia alba dolens due to obstruction of the iliac veins with periphlebitis and retrograde lymph stasis is an occasional important complication of the puerperium, but rarely if ever terminates in gangrene.

The arterial origin of peripheral puerperal gangrene is by far the most common and is probably always due to infection. In animal experiments on guinea pigs and rabbits in which extensive thrombi were produced under strictly aseptic conditions, not even the slightest tendency to a rise in temperature could be noted by Nakano. This strongly suggests the probability that the very common rise of temperature in thrombosis after childbirth is always referable to infectious causes. Thrombosis of the arteries of the leg might be due to an ascending thrombosis of the uterine artery from its terminal branches at the site of the placenta the thrombosis extends into the common iliac and even into

the aorta, or it may be continued downward into the external iliac, the femoral artery and its branches. The smaller blood vessels sometimes become obliterated through embolic plugs which have become detached from the thrombi in the large arteries. In favorable cases the onset of gangrene is prevented by the establishment of a compensatory collateral circulation.

The cases in which tissue necrosis does not occur until both vascular systems have become blocked and impermeable constitute the group of arteriovenous puerperal gangrenes. In other cases the blood coagulates secondarily in one system due to complete interruption of the circulation in the other. It is sometimes difficult if not actually impossible to decide if a given case is of mixed arteriovenous origin on account of the difficulty of ascertaining if the thrombi found in one system are of etiological importance or have formed secondarily without contributing to the production of the gangrene.

Although the reason still escapes us why in certain cases the septic or toxic process becomes localized in the internal wall of an artery and in other cases in the venous wall or in both the most common cause of puerperal peripheral gangrene is known to be a septic or toxic endarteritis and embolism from diseased heart valves usually occurring in cases of grave puerperal pyemia.

Infection no matter how slight and apparently irrelevant is invariably present and undoubtedly is always responsible for the conditions leading to gangrene of any kind. Childbirth and the puerperium naturally afford numerous opportunities for infection a very common and extremely dangerous avenue being represented by thrombi at the site of the placenta in the puerperal uterus. The ubiquitous streptococcus, often in association with anaerobic microbes has been demonstrated as the infectious agent in some of the examined cases. Not only the bacteria themselves, however but their toxins play an important part probably through lesions of the vascular endothelium which in combination with the altered condition of the blood during the puerperium predisposes to the formation of thrombi. In this connection

Arch. & Gynaec. 19, 207

Zentralbl. f. d. Gynaecol. d. Med. Chir. 12, 276, 5

Monchh. med. Wchnsch. 99, 26, 149

Starch f. d. ges. exper. Med. 1914, 21, 54

the contribution of Eichhorst on gangrene of the arms and legs after scarlet fever and other infectious diseases is very instructive. A retarded coagulation of the blood in puerperal women was recently demonstrated by Kottmana.¹ Mechanical factors, the recumbent position and relative immobility of the entire body also enter into consideration as possibly lowering the resistance against infection through retardation of the vital processes. It is suggestive that the majority of these gangrenes concern the lower extremities although the upper extremities are occasionally involved and in exceptional instances different extremities with other parts of the body may become gangrenous.

According to the fundamental teachings of thrombosis coagulation of the blood results even in the presence of a sufficient circulation whenever the endothelium of the blood vessels is damaged in its nutrition and thereby in its physiological function. Besides septic infection other causes such as a weakened heart action probably play only the part of the last determining factors. Post-operative thrombo-embolism was directly referred by Fraenkel² to septic infection having its entrance avenue at the operation wound and the same is undoubtedly also true for more distant puerperal thrombi which are likewise referable to a focus of infection. Arterial thrombosis is either the result of a preliminary change of the vascular wall or of a change in the composition of the blood or of a combination of both these factors. Changes of the blood itself usually affect the small and medium sized arteries exclusively whereas very large vessels may be blocked in consequence of lesions of their walls through microbes or their toxins. The pathogenic agents may lodge in the arterial intima giving rise to obliterative endarteritis or the germs in the circulating blood may be arrested in the endocardium where they cause an ulcerative endocarditis which in turn leads to embolism and death of the limb or the patient herself.

The extremely variable cause of the obstruction in the arterial and venous system

is best illustrated by the following tabulation adapted from Wornser:

OBSTRUCTION IN THE ARTERIAL SYSTEM

1. *Embolism*. In septic endocarditis (thrombi on the heart valves). Thrombosis of the heart chiefly the auricle the result of septic endocarditis parading embolism in case of a patent foramen ovale. In a woman who has reached the childbearing age (see cases of Wanner (Olivier) 1900).

Interd. Primary (septic and thrombotic endarteritis) secondary (through propagation of inflammation from the adjacent artery).

2. *Thrombosis*. Primary (ascending from the uterine artery or its terminal branches) or secondary (in total interruption of the arterial blood current at the first case).

OBSTRUCTION IN THE VENOUS SYSTEM

1. *Phlebitis*. Primary (septic and thrombotic) or secondary (a) through propagation from a metapneumonia (b) through extension from the uterine vein.

2. *Thrombosis*. Primary (thrombotic) or secondary (interruption of the venous blood current at the first case).

Symptoms. The phenomena of incipient gangrene are identical with those of mechanical obstruction of the blood vessel and naturally vary according to the mode of origin and the path of the infection in a given case. Pain is very pronounced and never absent in extensive vascular obliteration such as lead to peripheral gangrene. Infection usually being the etiological factor the ordinary symptoms of puerperal fever are apt to precede the signs of tissue necrosis. Septic puerperal endometritis is present in the majority of the cases. In milder cases only a rise in temperature will indicate some slight infection. The mode of onset of the gangrenous symptoms will sometimes though rarely suggest the cause and seat of the vascular obstruction. A sudden onset usually points to embolism in the arterial system (dry gangrene) while on the other hand the gangrene may develop very insidiously in the case of a small embolus. The onset of gangrene may be abrupt or gradual also in cases of purely venous obstruction (moist gangrene) so that the rapidity of evolution of the symptoms permits only an uncertain conclusion as to the seat and origin of the obstacle. In a general practical way it may be said that the early appearance of gangrene in the first few days of the puerperium points to an arterial (the most common) origin.

The *manifestations* of puerperal peripheral gangrene do not require a lengthy description. Aside from the severe pain already referred to the absence of arterial pulsation below the thrombus or embolus is an important sign characteristic of the cases of arterial blocking. The sensibility is usually distinctly diminished, while the motility may be preserved. A livid discoloration and a relatively diminished temperature of the affected area add to the probability of incipient gangrene. In cases of venous origin the inflamed veins of the pelvis are often distinctly palpable by the rectum or the vagina due to the existing thrombosis and periphrastic edema.

The two forms of dry and moist gangrene are apt to be combined in the same case, depending upon the rapidity of complete interruption of the blood current and the presence of external factors which favor mummification. Although the intolerable pain subsides as a rule when the gangrene has become established, the patient's general condition now becomes seriously aggravated through the absorption of necrotic tissue constituents. Before demarcation has occurred death may supervene under increasing pulse and temperature especially in cases of arterial obstruction.

Prognosis. The prognosis of puerperal peripheral gangrene is governed in the first place by the timely performance of amputation. Unfortunately amputation is not always practicable on account of the bad general condition, the rapid progress of the gangrene or because the seat of the obstruction is located high up in the aorta. Puerperal peripheral gangrene has accordingly a very bad prognosis as one half to two-thirds of the patients die for we are not able at the present state of our knowledge to prevent such an unfavorable outcome. While the mortality is still deplorably high it has nevertheless been lessened by one half since the institution of modern measures of treatment. The arterial venous or arteriovenous pathogenesis probably have no marked bearing upon the prognosis or the mortality although it appears that the mixed arteriovenous type of puerperal gangrene is credited with the most favorable figure.

Treatment. The treatment of incipient puerperal peripheral gangrene consists of purely conservative measures applying simply to the prevention of thrombosis and embolism by means of elevation of the extremity heart stimulants judicious transfusion and similar measures. The appearance of the line of demarcation is the signal for surgical interference. Although the dangerous symptoms may apparently subside because the organism endeavors to resist the absorption of decomposition products from the necrotic area it is imperative to remove the gangrenous part as promptly as possible for the safeguarding of the patient's life.

The *prophylaxis* is limited to the ordinary aseptic and antiseptic management of all deliveries, strengthening of the general circulation by heart tonics improvement of local circulatory conditions through elevation and gentle massage. When thrombi have formed elevation of the part is the best treatment to prevent their progress. Premature movements favor the onset of embolism and endanger life.

The manifold instructive features of these cases are best brought out by a comparative study of the material in the general literature. The compilation of authentic cases from the literature of the world brings the entire number of observations up to 76 including 64 cases of peripheral gangrene following labor with one personal observation (author's second case) 4 cases after abortion with a personal observation (author's first case) four cases occurring in the late course of pregnancy and 5 cases after gynecological operations which have been added for reasons of completeness. Twelve years ago in 1904 a list of 80 cases was published by Wormser but this contains a number of observations which are not verifiable or do not properly belong under this heading. In order to correct another statement of Wormser's the author wishes to state that Begg's article was published in the *Lancet* in 1870 and not 1876. Inaccuracies along this line are especially common in the French literature where, for example a case is persistently credited to Roux instead of to Rouse, an English contributor to the *Lancet* in 1896. Moreover

Lafond and other French writers cite 4 cases by Simpson and apart from these the observations of Cowan Bottomley (called Bos-somby) and Reid which are precisely the cases reported by Simpson.

The following cases all very old incompletely reported and partly inaccessible in the originals are cited after Wormser¹

CASE 1. Unnamed observer in 154 Rec. period obs. de med. de chir. de Pharm. Par. Vol. 1 p. 149, described gangrene of one extremity twelve days after labor amputation on the same day without noticeable arterial bleeding. The other lower extremity was shortly afterward affected in the same way and the patient died five weeks after confinement. No autopsy.

CASE 2. Latham Med. Comment. 40. 11 163 described a case in a woman between 30 and 40 three fingers of whose left hand gradually became quite painful one week after childbirth and were removed without pain or hemorrhage. The condition recurred about six days later and at the end of another fortnight the part below the wrist were removed. Finally the ulna and radius became loose and were cast off but the patient recovered.

CASE 3. Coctsem Ann. Soc. de méd. le. (and 1835) Puerperal gangrene of upper extremities nose upper lip cheeks also gangrene of the right leg and knee.

CASE 4. Tonnelle Arch. gén. de méd. 1840. Vol. 42. Case of puerperal gangrene in a primipara of 24 developing eight days after delivery in different regions of the body including the anterior portions of the thighs and the heels. Death on tenth day.

CASE 5. P. E. Edouard Raynaud Thèse doct. Paris 1841. Puerperal gangrene of part of both arms cheeks and chin.

The majority of the cases 53 in number concern peripheral gangrene of the lower extremities. The left leg or foot alone was affected 16 times the right leg or foot alone 15 times both lower extremities 15 times. In 3 of the case reports the affected side is not specified. In one instance (Begg's case) both hands both feet, the tip of the nose and portions of the ears were gangrenous. Mau-rice Raynaud's case fifteen is similar to this. In Rouse's first case both legs five fingers and the right ear were affected. MacFar-lane's patient had gangrene of the right leg and right arm and Levers' patient of the left leg and left arm.

Following abortion gangrene of the lower extremities is represented by only three

cases of which one came under the author's personal observation and was followed by recovery. The right leg as in this case was likewise concerned in a case with a fatal outcome reported by Anderodius. In another case (Bégoun and Anderodius) both lower extremities were involved and the right leg was amputated but without saving the patient's life.

Gangrene of the upper extremities a relatively rare puerperal complication is noted in 10 cases five of which concerned both arms one with involvement of the legs one the left and one the right arm. In one instance one finger of each hand was affected in another the fingers of both hands finally in one case there was symmetrical gangrene of the fingers toes and ears. Following abortion there is only one recorded example of gangrene of an upper extremity namely Oles's case (Simpson) in which the left hand was affected.

The rarity of peripheral gangrene during pregnancy is illustrated by the scanty number of corresponding observations on 4 cases. Three of these cases concerned the right leg one (which recovered) with simultaneous slight involvement of the left leg. In the fourth case the little finger of the right hand became gangrenous and was amputated. All these cases occurred in the latter part of pregnancy.

Peripheral gangrene as a sequel of gynecological operations has been reported in 5 cases which for reasons of completeness have also been tabulated. In the youngest patient a primipara of twenty years with severe puerperal infection requiring abdominal hysterectomy both legs were affected by symmetrical gangrene and amputation was performed with a successful outcome. The other four patients elderly women died one with gangrene of the left leg one of the right arm and one with gangrene of one lower extremity which was amputated without saving the patient's life. The gynecological operations which had been performed were laparotomies for ovarian sarcoma multiple or unusually large myoma abdominal hysterectomy and oophorectomy plus appendectomy (Lahenthal's case).

The above figures are given approximately rather than accurately for it will be readily understood that some of the cases belong to more than one group while in others no detailed statements are available.

Arterial obstruction through embolism or thrombosis due to endarteritic changes is especially noted as the cause of the gangrene in 29 cases. Disease of the heart (vegetative endocarditis aortic stenosis thickened mitral valves etc. etc.) alone or in combination with arterial obstruction are noted in 13 cases and persistent foramen ovale in 3 cases. Here it must be emphasized however that many cases did not come to autopsy and are incompletely reported in this respect the observer leaving the cause of the gangrene an open question. Obstruction of both arteries and veins was present in 12 cases Begg's case being doubtful however Venous obliteration alone was apparently responsible in 9 cases (Willcox's case being doubtful) In Schaeffer's case no changes at all were found neither in arteries nor veins. In 3 out of 4 cases of post-operative gangrene it is stated that the arteries were thrombosed.

Very rarely and as a suggestion rather than an assertion a patent foramen ovale is mentioned in explanation of a paradox embolism as in Oliver's first case and in Willcox's case. However Popow directly charges the open foramen ovale with the responsibility for the puerperal gangrene of both arms in his case, which was free from endocarditis. Among the seventy five tabulated cases, thirty three patients recovered and forty died. In two instances (Cowan's second case and Dickinson and Hubert's second case) the outcome is not stated. Only 4 among the 33 cases recovered without an operation (Guthrod's second case Dickinson and Hubert's first case Seidelmann and Schulz's cases).

The presence of an infectious disease was noted in several of these cases. The peripheral gangrene in Schulz's patient developed after premature labor at the end of the third week of typhoid fever. In Seidelmann's case the gangrene followed on pneumonia. Oliver's second patient had pneumonia of the right lung. Pleurisy is stated in one of Cowan's cases.

Puerperal fever and obliterative endarteritis preceded the gangrene in Etienne's case six months after childbirth. Severe puerperal infection necessitating abdominal hysterectomy is noted by Roux de Brignoles and Auriant. Puerperal ulcerative endocarditis as a forerunner of gangrene is mentioned by Baré and du Casel.

General sepsis is mentioned three times and pyemia once in association with puerperal gangrene of the extremities, and Montault's patient suffered from peritonitis with probably general sepsis. In altogether six cases peripheral gangrene occurred in combination with eclampsia. The occurrence of puerperal mania is specially mentioned in two observations.

From the forensic viewpoint, the sporadic occurrence of puerperal peripheral gangrene is very important in so far as it may strike when least expected in an apparently uncomplicated case like lightning from a clear sky. Forewarned is forearmed and the large collection of cases from the literature will serve as a helpful precedent. It is also in this regard that the author hopes to have offered a serviceable contribution to surgical gynecology in supplementing his personal observations with the interesting material which is so widely scattered in the general literature.

Although the co-operation of unfavorable circumstances which lead to peripheral gangrene can hardly be foreseen and prevented, the safety of our puerperal patients will be decidedly enhanced if the possibility of such a formidable complication is kept in mind. That youth, a healthful condition, and a normal labor do not afford protection, is shown plainly enough in the cases embodied in this paper. A thorough knowledge of the predisposing causes and watchful care at the bedside are the only means to check a further extension of the list of peripheral gangrenes due to the puerperal state.

A. PUERPERAL GANGRENE OF LOWER EXTREMITIES

BARÉ and DU CASSEL. Étude clinique sur les embolies de l'aorte et recherches expérimentales sur la production des souffles cardiaques. Arch. gén. de méd., 88, 190.

Woman age 30 years, four and half months after normal birth of her healthy third child was admitted to the hospital on account of indigestion with loss of con-

foot. Amputation of left leg, upper third. Examination of the specimen showed thrombosis of the posterior tibial artery. The thrombus extended upward from the site of the amputation and could be drawn out from the vessel.

CROSSBOROW. Gangrene der forme im Pericarpium. Russk. Vrach. St. Petersburg. 905 VII, 246 Petersburg. med. Zisler 909 XXX, 37.

The author observed case of gangrene of both feet, in the pericarpium, terminating in death. The patient was 42 years, eighteen years of age. Manual extraction of placenta. Left thrombophlebitis. Thirty day post partum gangrene of left foot. Finally death after erysipelas had set in.

COWAN. Cited by Simpson Selected Gynec. & Obst. Works, 87 p. 564.

Patient age 36 healthy and active. Delivered of fourth child, lochia and lacteal secretions were normal. On the morning of the fourth day she had severe rigor, and when soon she was screaming from excruciating pain, referred principally to the upper and inner portion of the left calf which was cold and tense, but not increased in size. This condition extended to the foot, on the forepart of which large spot of ecchymosis appeared, most evident upon the metatarsus and creeping upward to the ankle-joint. The uterus was perceptibly larger than usual. The discoloration had reached half way up the calf of the leg (having a very margin) and was still advancing. The following morning vomiting had begun on the spot first discolored and the patient was rapidly sinking. Death occurred early on the fourth day of the disease and the eighth day after delivery. N. autopsy.

COWAN. Cited by Simpson Selected Obst. & Gynec. Works, 87 p. 564.

Patient aged 5. Ten days after delivery of her first child she was seized with gangrene of one of the lower limbs. The gangrene involved the foot and leg joint. The knee-joint, the patient was greatly exhausted and anxious, but not suffering severely. The limb was amputated at the lower third of the thigh, but not a drop of blood followed the knife. She died the next day of exhaustion. No autopsy.

D. VIER, J. A case of phlegmona dolens, which terminated in aphrodisia of the leg and foot. Lond. Med. Repository 85 XXXII, 45.

The patient 41 years, was suddenly seized with most excruciating pain in the left loin and hip, two weeks after her last confinement. The limb gradually became swollen and very cold, the leg and foot and lower two-thirds of the leg were of dark purple color and distinct line of demarcation formed. In the course of the following week considerable sloughing took place on the lower and back part of the leg, until scarcely anything remained but the bare bones. The author finally removed the limb above the knee. As soon as the vessels were cut across, the blood in the veins was seen to be coagulated, arteries intact. Patient made good recovery.

DECOUVER. Embolie de la partie inférieure d'aorte. Gaz. d. hôp. 880, p. 735.

Primipara, age 22 years, two weeks after normal confinement, was attacked by severe pains in both legs, and examination showed the absence of pulsation in both femoral arteries. Next day appearance of large discolored patch on anterior portion of left knee, followed by other patches on the left calf, and purplish discoloration on the right side. Lower portion of right leg was discolored up to

5 cm. above the malleoli. The condition of the limbs became aggravated in the course of the following days, while the general condition improved until three weeks after the first onset of the pain, the patient had an attack of delirium, followed by fever and died three days later. N. autopsy could be obtained. Judging from the similitude of the appearance of the disturbances in both limbs at once the obstacle must have been situated in the aorta near the bifurcation.

DURLOU. Gangrène du pied droit ayant déterminé la mort un mois et demi après l'accouchement. Progrès méd. 83 p. 3.

Woman 39 years old IV-para, toward the end of pregnancy had sudden pain in the right foot with discoloration and immobility the foot being absolutely cold. After while the foot became black. Ten weeks after the onset of these symptoms she was delivered of dead child. One month after confinement the patient was in very bad condition the foot being black and immovable and the thumb soft to touch. On pressure there was gaseous crepitation. N. edema of the leg. Sugar in the urine not due to previously existing diabetes. Bloody expectorations. Death seven weeks later. On topography the genital organs were found to be normal. In the right upper lung gangrenous pneumonia. Slight thickening of mitral valve heart otherwise normal. Right femoral artery obliterated by thrombus commencing immediately below the bifurcation of the aorta. All the arteries of the right leg also obliterated. The author does not assume an embolus because the heart practically normal.

DUKE JAMES. Cited by Simpson Selected Obst. & Gynec. Works, 8 p. 530.

Patient delivered of first child after protracted labor. Two weeks after delivery gangrene of both lower extremities. Death four days after admission to the hospital. On dissection heart was found to be normal. Beginning about an inch and half above the bifurcation of the aorta, fibrous plug was found which completely occluded the artery and extended along the common iliac, and as far as one or two inches down the external iliac arteries on each side. A prolongation of the plug shut up also the canal of the internal iliac artery on the left side. On the right side the opening of the internal iliac artery was occluded by the obstructing mass occupying the common iliac artery. The femoral and other arteries below were quite healthy and the veins of the limbs presented no special morbid appearances.

EDWARDS. A case of bilateral gangrene of the legs following confinement. Brit. M. J. 93 p. 27.

Patient, woman 38 years old as admitted to hospital two days after normal delivery of her twelfth child. Ten days after admission, symptoms of incipient gangrene made their appearance, the condition becoming aggravated about week later and gangrene simulating more the dry type than otherwise was manifest. Three days later the limb was amputated through the middle of the thigh; well above the external limits of the spreading gangrene. At the end of five days following the operation, loss of circulation was noticed in the right lower extremity and gangrene up to the knee became evident. Patient refused to have the limb amputated, her general condition up to the time of death remained remarkably good. Death took place suddenly about twelve weeks after the first appearance of gangrene. Post-mortem examination showed that the external iliac and the common iliac arteries, as far as the bifurcation of the aorta, were blocked by continuous thrombosis, evidently of some standing.

ESCALIER. Bull. Soc. anat. de Par. 1846 xxi 277

Presentation of specimen from a woman 28 years of age who had died of spontaneous gangrene following her first confinement. After an attack of peritonitis pain was felt in the right leg without signs of phlegmasia alba dolens. Four days later gangrene manifested itself and at the time of the patient's death, on the fifteenth day after the onset of the disturbances the gangrene extended above the calf. At the autopsy the hypogastric veins and several of their branches as well as the right common iliac vein were found blocked by solid gray thrombi adherent to the vascular walls. The iliac artery at its junction with the femoral contained a firm grayish clot which filled the third part of the arterial lumen and became bifurcated at the level of the profunda femora. The findings were suggestive of a partial arteritis due to compression of the femoral artery through an abscess of the iliac fossa.

ETIENNE. Gangrène massive d'un membre inférieure par endartérite oblitérante progressive suite à distance d'une infection puerpérale. Arch. gén. de med. 1900 n. p. 2402

Patient, primipara 26 years of age, forceps delivery. Infection of wound in vulva, puerperal fever, recovery. Some months after childbirth, onset of double phlebitis of lower limbs, type of phlegmasia alba dolens, requiring three months for its cure. About three months after recovery from this phlebitis, vesicle filled with reddish fluid appeared in the anterior portion of the middle third of the right leg. This was soon followed by symptoms of incipient gangrene with discoloration in the left foot. The condition became gradually worse, the patient left the hospital and died about 3 weeks later.

IVISON. Malignant gangrene of both legs following parturition. North Car. M. J. 1889 xvi 49

Patient, primipara 20 years of age. Symptoms of septic infection five days after childbirth with chills and fever. Within ten days she complained of cold feet with intolerable burning pain. Within fifteen days appearance of characteristic dusky hue of gangrene in both feet. The morbid process continued, reaching in the left leg, within three inches of the knee, and in the right leg, three inches above the ankle, before the patient succumbed to pyemia ten weeks after childbirth.

FISHER TH. Double phlegmasia followed by gangrene of the right foot. Lancet Lond. 1898 i 995

Patient 45 years old. XI para. manual extraction of placenta on account of hemorrhage. Deep collapse 4 days after confinement, pains in abdomen and joints, diarrhoea. On the eighth day phlegmasia. Pulse 120 to 130, temperature 40°. On the twelfth day, bluish discoloration of right leg, and diminished sensibility. General condition of patient very poor but improved under stimulants. The toes became gangrenous and were finally amputated.

The author discusses only the influence of marked hemorrhage on the formation of the phlegmasia but does not enter into any discussion on gangrene.

The case is similar to Wormser's first case.

FUSSEL, N. H. Gangrene of leg following labor. Uni. M. Mag. Phila. 1888 i 165.

Patient had injured the great toe of left foot, eczema of knee followed previous to present pregnancy. In eighth month of pregnancy left thigh twice its normal size, covered with "buccinas." Two hours after labor (normal lying child) the limb became livid, there was intolerable itching and burning, the foot was cold and the patient

went into collapse. No amputation on account of bad general conditions. Death.

The author thinks that the popliteal artery was closed by a thrombus, which began to form a few days previous to labor. The slowing of the blood in the artery consequent to labor allowed a complete thrombus in the inflamed point and consequent gangrene resulted.

GOLDENFELD LU. Die Leber Cirrhose der Extremitäten. Inaugural Dissertation. Bonn 1900

Patient 55 years old, normal, lived out of bed the eighth day. On that day a little pain appeared in left foot, the hair on a few days became normal, hair and fat penetrated, odor of pulsation in the popliteal artery. The left thigh was swollen, but not painful. The right leg was highly edematous and very painful. Amputation of left leg below the knee. Recovery.

Diagnosis: gangrene due to embolism. The location of the embolism.

LEITCH, R. O. Gangrene of the limbs. M. N. (Lancet) 1898 xvi 34

Patient, primipara 26 years of age, had many eclamptic convulsions in number and as treated with trypsin. On second day of the eclamptic attacks, a septic state set in, the temperature rose to 102° F., the pulse was 120, the patient was delirious, the urine was bloody, the patient was in a state of collapse. The patient died on the third day. The patient had been in a state of collapse for several days before the onset of the eclamptic attacks. The patient had been in a state of collapse for several days before the onset of the eclamptic attacks. The patient had been in a state of collapse for several days before the onset of the eclamptic attacks.

CASE. XI para. 4 years of age had eclamptic seizures before and after parturition. Patient died on the tenth day of the evening of this day, the temperature had been perfectly normal in the last five days, sudden rise to 102° F.

The left thigh presented a bluish black discoloration of the skin and the temperature was bright red almost to the knee joint. The gangrene and inflammation pressed during the first day but remained limited to the knee and became necrotic. The process lasted over four months under high and antiseptic treatment.

H. GEMMEL. Ueber puerperale Gangraen der unteren Extremitäten. Wien. klin. Rundschau. 90 x 685

The patient, XI para. 4 years of age had myodegeneration of the uterus and secondary retention of the placenta. On ninth day after delivery symptoms of thrombosis in left leg, followed by dry gangrene of the foot and the distal part of the leg. On seventeenth day after childbirth amputation of the lower third of the thigh. Recovery.

Examination of the amputated extremity showed a threatening evident embolism of the bifurcation of the popliteal artery. All the arteries were thrombotic.

V. HOCHSTETTER. Spontane Gangraen beider unteren Extremitäten nach dem Puerperium. Wien. med. Wochenschr. 1883 p. 4

Patient, 24 years old. During the fifth week pains in right leg which became ordematous. During the seventh week post-partum, the patient was admitted to the hospital. At that time the entire foot was bluish black.

pulse in femoral artery not present. The veins were not dilated. Heart and urine normal. Temperature 38.5. During next few days demarcation below malleoli. About 3 weeks after onset of discase pains in left leg which was black up to knee and anesthetic but not anemic. Demarcation of left leg up to height of the knee. Two months after beginning of discase, amputation, on the right side above the malleoli and on the left in the middle of the thigh. A description of the findings of the amputated legs. Recovery.

The author explains his case as follows. Ascending thrombosis of the right tertiary artery and of the hypogastric and external iliac arteries followed by gangrene on the right side then continuation of the thrombosis up to the bifurcation of the aorta and here (1) that point either occlusion of the left common iliac artery or embolism followed by gangrene on the left side, and finally extension of the thrombus up to the renal artery which might explain the existing albuminuria.

LARCIERREUX. Phlébite postpartale. *Gaz Méd* 887 No. 8.

Patient 30 years old III para, normal delivery out of bed on fourth day. On fifth day edema of left leg. Urine and heart normal. Three days later after the first signs of edema on the left leg had subsided edema appeared of the right leg of the abdominal wall and also of the left labium majus. The diagnosis as obstruction of the hypogastric vein and vena cava. About month later coughing, dyspnea and pneumonia in the left lower lung set in, due evidently to pulmonary embolism. One week later marked pains in both legs with discoloration. Sensibility diminished and practically gone below the ankle. Diagnosis as obstruction of the two femoral arteries because no pulsation was felt over them. Death. A topography of the thromboses. All the veins (hypogastric, external iliac, femoral and renal) obstructed by clots. The aorta, the renal arteries, the common iliac, the hypogastric, the external iliac and the femoral arteries, thrombotic.

The author explains the formation of the thrombosis as follows. It started in the tertiary sinuses and as propagated into the renal veins, and thence into the renal arteries either by contact or through the renal capillaries, from the renal arteries the process extended to the aorta and downwards.

LARCIERREUX. Cited in Trousseau's *Thrombose d'agregation*, 880.

The patient, woman 35 years of age, with phlegmasia alba dolens of the right leg, beginning six weeks after confinement and terminating in abscess and gangrene of the calf died one month after admission to the hospital about ten weeks after childbirth. The autopsy showed considerable edema of the lower extremity with extensive gangrene of the calf and the lower surface of the right thigh. The femoral veins contained black clot, becoming less firm and dark in its upper portion. In the iliac veins the clot began to be softened in the center and it reached into the inferior vena cava, as far as the renal veins. In the right renal vein it went process which entirely obliterated the vessel, and another process extended into the left renal vein, blocking it only at its termination. The hypogastric veins were filled with more or less indurated blood-clots.

LARCIERREUX. Cited by Simpson, *Selected Obst. & Gynec. Works*, 871 p. 530.

Patient suffered from an attack of acute rheumatism during pregnancy and died after a few days' illness following delivery. During this period it was discovered, that

there was no pulsation in the arteries of the left arm; and subsequently the same absence of pulsation was observed in the left inferior extremity. Local symptoms of gangrene were manifest in the left hand and left foot. At the post-mortem examination, mushroom-like vegetations were discovered on the valves of the heart, and in the arteries of both the affected extremities vegetations were found obstructing the lumen while the veins contained phlebotiths.

LEVENKOWSKY. Ueber die Entstehung von Gangraen der Extremitaeten nach der Geburt. *Gaz. lek.*, 19.

N. 3.

Gangrene of the foot on seventeenth day of septic puerperium after complicated labor. A thor claims the gangrene was due to embolism of the dorsalis pedis artery.

N. utopay.

Primipara, 8 years of age. Diarrhea for long time before birth of a dead premature child. Ulcers paronychia paronychia vaginitis paronychia. Right foot became swollen on the fourteenth day after delivery gangrene three days later. Patient was now admitted to the hospital, where she died at the end of twenty four hours.

LEVENKOWSKY. De la gangrene des extremités chez les accouchées. *Gaz. hebdom. d. sc. m. d. de Bordeaux*, 90.

xxii.

The patient, I para, had thrombosis and suffered from eclamptic attacks during labor, was delivered by forceps of a dead child. On tenth day phlegmasia alba dolens, on right side four days later onset of gangrene of right leg requiring amputation two months later. The operation was followed by recovery. Examination of the amputated extremity showed the presence of clots in the arteries, which presented endarteritic changes caused by streptococci.

MACFARLANE. Cited by Simpson, *Selected Obst. & Gynec. Works*, 87 p. 530.

The obstruction of the artery occurred suddenly ten days after the patient was delivered naturally and easily of her fifth child. At that time she began to complain of acute pain and numbness in her right arm, which, with slight intermission from opiates, etc., continued till her death at the end of three weeks. No pulsation could, from the first or subsequently be felt below the middle of the brachial artery. A week after this arterial occlusion in the upper extremity a similar change took place in the right thigh, accompanied with acute pain. This ended in a great measure four or five days after when unequivocal indications of gangrene showed themselves, commencing at the toes and extending to the knee. On dissection the aortic valves were found to be covered with numerous vegetations. The aorta was dilated and studded with thrombotic deposits. At the points of obstruction (viz. the middle of the brachial, and the commencement of the lower third of the femoral arteries) fibrous clots were found, which completely closed these vessels.

MANDEL. Ein Fall von Gangraen der beiden unteren Extremitaeten im Wochenbette. *Wien. med. Wchnschr.* 90 II, 307.

Primipara, 3 years of age, spontaneous labor fever from second day on, infected perineal wound. Venous thrombosis began on seventh day on the left side, on eleventh day on right side, leading to gangrene on the thirteenth day. Whereas on the left side the gangrene was limited to a few superficial areas, amputation above the knee had to be performed two and one-half months later on the right

side the operation showing that all the arteries and veins were blocked. Favorable healing of the stump. Recovery.

Monk. Cited by Simpson, Selected Obst. & Gynec. Works, 1871 p. 535.

Patient, I-para, was prematurely delivered. Three weeks afterward pains like those of neuralgia were experienced first in the right leg and then in the left. Seven weeks after delivery there was sudden pain and tenderness in the left groin. At this time a loud systolic murmur could be heard. Some days subsequently the pulse in the right arm became suddenly arrested and no pulsation in the right femoral and iliac arteries could be felt. The arterial pulsation in the larger vessels of all the extremities had ceased with the exception of the left arm. Finally gangrene of the great and two next toes of the left foot set in ten weeks after delivery. The patient died a few days afterward.

Autopsy. Thrombi in bifurcation of aorta, common iliac and external iliac arteries vegetative endocarditis.

MONTAUD. Accouchement naturel, péritonite engorgement des membres inférieurs avec symptômes de phlegmasia alba dolens mort. Présence de pus dans les veines des jambes. J. compl. d. sc. méd. 1831 lx, 11.

Patient a woman 3 years of age on day following normal birth of a healthy child, was attacked by peritonitis. Twenty days after the delivery the left thigh became swollen and very tender on pressure. The swelling increased in the course of the next following days and a week later had invaded the right lower extremity under the same symptoms. The gangrenous patches extended into the depth of the tissues and the patient finally succumbed to exhaustion five weeks after delivery. Autopsy showed phlebitis with the presence of pus and of whitish false membranes in the veins of the legs.

OLIVER. The Gangrene of the leg in puerperal women with severe pain in and analgesia of the affected limb. Lancet Lond., 1866 ii 15.

CASE 1. Patient 33 years old I-para, in good health. Labor and early part of puerperium normal. Two weeks after labor patient became weak and paresis of the right arm and facial nerves developed. There was a slight aphasia. The right leg was intact. On the following day the paresis had disappeared, whereas marked pains in right leg set in. The same evening the small toe of the right foot became gangrenous. The lower two-thirds of the leg showed a darkish blue discoloration. The next morning the temperature was 98.8° pulse 64. The foot was nearly bluish black the leg showed livid discoloration and was cold and anesthetic up to about 4 inches above the knee. Passive motion of the leg and pressure on the big arteries and veins was extremely painful. No albumin in urine heart normal. The gangrene progressed rapidly without a marked demarcation. Two days later amputation was performed about 5 inches above the knee. Recovery. The popliteal artery and vein of the amputated limb were thrombotic. (Whether the thrombi were tightly adherent to the walls of the vessels is not stated.)

CASE 2. Patient 45 years old II para, normal labor. About four days later pneumonia of right lung six days later quite suddenly marked pains appeared in right leg, the leg showing no abnormal condition. Examination showed a marked systolic murmur of mitral valve. The whole left leg was infiltrated. Nothing was felt in the abdomen. The right leg was pale cold swollen anesthetic. The skin was purplish blue. Over the aorta, there was a slight systolic murmur. The foot and leg up to

about 3 inches below the knee were entirely anesthetic and cool. As apparently the gangrene spread rapidly amputation above the knee was performed. Five days after operation patient was decidedly better but she died three weeks after operation. Autopsy.

Examination of amputated leg showed embolism of popliteal artery extending into its two branches all the veins contained coagulated blood (thrombi).

This second case is remarkable because the endocarditis developed so to say under the physician's eyes (similar to Werners first case). The thrombosis of the veins is also of a secondary nature. It is clearly a case of general sepsis similar to Winckel's case.

In Oliver's first case it is also remarkable that the gangrene developed so quickly that in 4 days after the onset of the first pains amputation of the thigh had to be done. On the fourteenth day after confinement general debility and paresis set in due in Oliver's opinion to embolism of one of the arteries of the brain whereas the obliteration of the popliteal artery was consequent upon the action of a poison causing clotting of the blood.

The heart was normal. If that was the case there is only one explanation of this case similar to Wanner's case and that is that there was an open foramen ovale i.e. an embolism from the side of placental insertion. The embolus is not thrown from the right auricle into the right ventricle and from there into the pulmonalis but finds its way through the open foramen ovale into the left heart and divides itself there into different parts. Small particles were thrown into the left carotid and gave rise to the embolus in one of the arteries of the brain whereas the bigger part of the embolus is thrown into the cruralis where it forms a total occlusion of that artery. The clots in the veins are apparently of secondary nature as there is in the clinical picture no signs of any phlebitis.

It is hard to give a satisfactory explanation for the extremely quick progress of the gangrene.

OVERSIEDE. A case of phlegmasia dolens, terminating in gangrene of the foot. Amputation, Recovery. Med. & Surg. Reporter 1875 xxxiii 127.

The patient, a woman 34 years of age, developed gangrene of her left limb about three weeks after the birth of her eighth child. Severe pain in the limb which was swollen and tender especially along the course of the femoral vessels was felt first on the ninth day after con-

confinement and fortnight later evidence of gangrene was seen on the inner side of the heel rapidly spreading and invading the entire foot. Amputation as performed at the lower third the swelling disappearing rapidly and the patient less than two months later was discharged with good stump, and health completely restored. At the time of the operation the large arteries were found completely obstructed.

PHILLIPS, R. Gangrene of the legs during the puerperium. Death. *Middlesex Hosp. J. Lond.* 1901, 111, p. 70.

Apparently normal puerperium for seven days after birth of patient, third child. Well nourished woman of 30. One week after childbirth, alarming attack of sudden severe pains shooting down the left leg, with general collapse. Signs of femoral embolism were found on examination. Condition of the leg did not improve, and four days later the toes began to become discolored. Light days after the first attack patient had similar attack in the right leg. Her condition from now on got worse, the feet and legs gradually passing into state of dry gangrene. Gradually the gangrene extended half way up the left thigh and above the right knee in its upper part being moist and offensive. Patient gradually weakened and finally died fifty nine days after labor. She was never in condition to permit operation. The uterus and heart were normal.

REID, ROWEN. Cited by Simpson. *Selected Obst. & Gynec. Works*, 87, p. 564.

Patient had previously borne large family. Last labor was easy for it came premature. Child born dead. On the third or fourth day subsequent to delivery fever supervened, followed by swelling of the left leg. Such was attended by great pain and suffering. In the course of two or three days gangrene set in and she died ten days after delivery. N. torrey.

ROBERT, L. R. Gangrene complicating puerperal mania. *Lancet*, Lond. 1896 II, 375.

CASE. Patient 3 years old I-pars. T. weeks after normal confinement admitted to London County Asylum on account of mania. Physical condition good. Eight days after admission to the asylum pains in feet and fingers which were cold, anemic and anesthetic. The next morning all the toes and the five fingers of one hand and the right ear were gangrenous (Raynaud disease). N. fever. The lochia which are suppressed for while became very offensive. The gangrene of the feet progressed slowly. Temperature up to 101. On account of impending heart failure amputation of both feet, on the right side at the lower third of the leg and on the left side after Syme method. On the thirty first day after amputation temperature on both stumps new gangrenous spots which were cauterized. Recovery. Left the asylum after eight months in mental normal condition.

CASE 2. Patient 37 years old, V-pars. Confinement three months previously. Admitted for very pronounced maniacal condition. Two weeks after admission, there set in very rapidly progressing gangrene of the right foot and leg. Amputation after two weeks from onset of symptoms in lower third of the thigh. Examination of the amputated limb showed very extensive thromboses of the veins and endarteritis of the larger arteries.

It is a question whether this second case can still be classified as a case of puerperal gangrene since the symptoms set in three

months after confinement, but the possibility of a connection cannot be denied. The case also is of interest because it was shown microscopically that both the arteries and the veins were diseased.

SEITZ, Ueber Uterineleisgangnen im primären febrilen Wochenbett. *München. med. Wchnschr.* 1903, 31, 963.

Patient, primipara suffering from gonorrheal infection. Puerperium wasafebrile but with constant slight elevation of the pulse rate. After moderate femoral edema and symptoms of crural phlebitis, without obtaining thromboses of the principal veins, rapidly progressive edema made its appearance in the left foot, followed by extremely severe congestion. Onset of gangrene three days later associated with establishment of severe coagulative hyperemia of the left foot. It inflammation of the right saphenous vein.

Amputation of the left foot. Examination of amputated portion showed cutaneous gangrene as far as Lafranc articulation. It circumscribed excoriations of the malleoli. The muscular gangrene concerned the vastus and the inner calf muscles. The arteries and veins were entirely free from thrombi or emboli. The congestion of the right foot subsided after the amputation of the left leg. Recovery.

SEITZ. Gangrene d'un membre inférieur pendant les suites d'accouchement. *Prov. méd.* 1903, 10, 303.

Gangrene of the left leg in previously healthy VII para of 35 years. Three eclamptic seizures before child birth, which was normal, and three seizures after delivery. Rapid recovery. Delirium and hallucinations on the fourth day. Two days later patient suddenly complained of severe pains in both legs especially the left. The end of three weeks this leg was cold, rigid, anesthetic up to four fingers width above the knee. N. palpation was palpable in Scarpa's triangle. On the eighth day after delivery the left leg was purplish in color and presented large blister on the external malleolus, on the twelfth day large blister appeared on the posterior surface of the thigh. The condition gradually became worse, the palms extending to the entire abdomen, and the patient died 3 days after confinement. N. autopsy could be obtained, but the bacteriological examination of the thrombotic blood in the left femoral artery showed the presence of streptococci and staphylococci.

TATE, MAGNUS A. Puerperal gangrene. *Am. J. Obst.* N. Y. 1903 LXV.

Seven and one half months pregnancy eclamptic. One day after confinement, patient had sleepy feeling in left foot, afterward both legs became gangrenous. Death 3 days after confinement.

VAN GHELEN. Puerperal thrombus, endocarditis, dry gangrene. *T. N. Y. Path. Soc. Med. Rec.*, 1893, Sept. 240.

Patient 3 years of age, 30 twenty days after childbirth, as attacked with severe burning pain in the right foot and leg. Discoloration of the skin, extending a few days later to the ankle, with complete blackening of the skin over the lesser toes. The patient lingered in great pain for five weeks and then died. The right femoral vein contained clot completely filling the vessel and partially organized. The right femoral artery contained firm laminated thrombus.

WÄNGBER, R. Zwei seltene Wochenbettkomplikationen. München med Wchnschr 1895 p 74.

Woman 31 years old II para normal labor. Four days later pains and oedema of the left thigh, the groin was red, tender and very sensitive. Slight rise in temperature several times during next few days. On the twenty second day of the puerperium a sudden collapse set in with marked dyspnoea. At the same time there were marked pains in left calf temperature rose. Small vesicles began to form on left thigh and right leg. No pulsation was felt over left popliteal artery. On the thirty first day the entire left leg was swollen and the skin discolored to a bluish black from the middle of the leg downward. The toes and the skin of the plantar pedis were entirely dried out and black. The line of demarcation established itself during the next few days. About the middle of the leg the mummification made further progress. Two months after confinement amputation. Normal recovery.

The anatomical examination showed an embolus of the popliteal artery with continuation of the thrombus to the tibialis antica and postica arteries. The heart was intact. The author therefore explains the embolus of an artery of the lung (collapse and dyspnoea on the twenty second day of the lying in period) on the one hand as well as the embolism of the big artery of one of the lower limbs through an open foramen oval (paravalvular embolism) (similar to Oliver's first case).

WILLCOX, F. A. A case of tedious labor followed by double phlegmasia alba dolens and gangrene. Lancet Lond 397 p 85.

Patient 44 years old I para. Anæmic otherwise healthy. Tedious labor patient rather weakened. I cepa delivery with laceration of perineum. First two weeks normal (temperature up to 99.5). On the evening of the sixteenth day very marked pain in left leg phlegmasia. Elevation of left lower limb. On the twentieth day the second toe of left foot became discolored this discoloration next day continued up to the ankle. On the twenty third day temperature rose. Patient excited. Left foot next day was very cold anæsthetic and black color. Very pronounced pains. On the twenty seventh day the abdomen was rather distended the pulse small and irregular these peritoneal symptoms subsided but on the thirty third day a phlegmasia appeared also on the right lower extremity. On the thirty fourth day the patient died due to her extreme feeble condition. Necropsy. Author gives explanation of the origin of the gangrene.

It seems that this gangrene was caused *only* through extensive thrombosis of the veins. This would be similar then to Winckel's case.

The same is illustrated also by an observation on a tuberculous boy of 18 years reported under the following title: Reyt. Étude sur les gangrènes d'origine veineuse un cas de gangrène du pied droit et de la partie inférieure de la jambe droite par oblitération veineuse avec intégrité des artères chez un sujet cachectique. Thèse de doct. Paris 1897.

WINCKEL, F. Die Pathologie und Therapie des Wochenbettes. 3rd ed. 98 p. 32.

Patient 33 years old II para. During the night of the second and third day after normal labor chills and

temperature up to 100. Pains in abdomen. The veins of the right thigh became inflamed. Reddish discoloration and a line spreading from the reddish and painful arteries all over the right leg. A small nodule on the left calf remained stationary. On the seventh day after labor a nodule was noticed on the right distal malleolus. Three days later the whole foot felt thick. It was found to be anæsthetic and a bilateral discoloration. From the next day pain was diminished. The gangrene progressed and small red heads appeared on the middle of the leg. Mort gangrene. Death followed on the sixteenth day.

A topographical dissection with dissection of the foot and leg. All the muscular vessels contained fibrinous masses. Same findings in the popliteal and crural veins up to the groin. At that point a white putrid thrombus was found in the crural vein. The arteries were empty. Besides these findings there was a purulent pleuritis and peritonitis (streptococcal abscesses of the lining lymphatics of the tricus valve of the spleen).

In Winckel's case there was *only* a thrombophlebitis involving practically all the veins of the leg. The arteries were empty. This case like Wilcox's case shows that gangrene can be due *only* to very extensive obliteration of the vein without an embolus or arterial thrombosis.

WILCOX, F. A. A case of tedious labor followed by double phlegmasia alba dolens and gangrene. Lancet Lond 397 p 85.

Patient 44 years old I para. Anæmic otherwise healthy. Tedious labor patient rather weakened. I cepa delivery with laceration of perineum. First two weeks normal (temperature up to 99.5). On the evening of the sixteenth day very marked pain in left leg phlegmasia. Elevation of left lower limb. On the twentieth day the second toe of left foot became discolored this discoloration next day continued up to the ankle. On the twenty third day temperature rose. Patient excited. Left foot next day was very cold anæsthetic and black color. Very pronounced pains. On the twenty seventh day the abdomen was rather distended the pulse small and irregular these peritoneal symptoms subsided but on the thirty third day a phlegmasia appeared also on the right lower extremity. On the thirty fourth day the patient died due to her extreme feeble condition. Necropsy. Author gives explanation of the origin of the gangrene.

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In this case the endocarditis without causing any symptoms was probably the cause of the embolism. (The endocarditis is not

essential to bring about an embolism as is proved in Winckel's case.)

ZIMMER, E. Ueber Gangraen im Puerperium. *Ergebn. d. Gynaek.*, 9, 4 p. 25. (This case is identical with that reported by Guggenberg, *Verhandl. d. deutsch. Gesellsch. f. Gynaek.* xv Kongr. B., 3.)

Patient 5 years old II-para. Four days after confinement slight mastitis on left side. Five days later patient out of bed. Seven days later recurrence of mastitis. On following day pains in both legs especially in calves and toes. Heart normal. Bluish spots on dorsal and plantar surface of right foot, and total anæsthesia up to about cm. above malleoli. On the day following also bluish discoloration of left foot but its circulation was gradually re-established, with marked hyperæsthesia. Demarcation of gangrene on right foot.

According to Zimmer patient was discharged without amputation being performed whereas according to Guggenberg's above-mentioned communication the gangrenous part of the right foot was amputated. The author thinks that in this case the gangrene was due to ergotism because as he says the symptoms appeared simultaneously in both legs. I am rather inclined to believe that here too we have to deal with an infectious process (mastitis being present).

B. PUERPERAL GANGRENE OF THE UPPER EXTREMITIES

BILLROTH. *Chir. Klin.*, Berl., 87, p. 470

Spontaneous gangrene of forearm of puerperal origin. Patient was woman 25 years of age near the end of her sixth pregnancy. Four days before an easy labor at term, she felt pain in her left hand, and two days later the entire upper extremity was swollen, up to the axilla. Seven days after the onset of the pain the fingers became blue then black, and the gangrene rapidly invaded the forearm. Amputation of the limb, at the middle of the arm, on the twentieth day after the appearance of the pain. Complete recovery within one month after operation.

Billroth did not see this case himself, but from the description believes it to have been due to embolism of the ulnar artery probably referable to endocarditis, with vegetations on the aortic valves. He states that he observed an entirely analogous case also originating during pregnancy of spontaneous gangrene of the leg in Zurich.

COMMANDEUR and GOWNET. *Phlébite double des membres supérieurs causée de l'infection puerpérale*. *Soc. Chér. de France*, 909 Oct.

Bilateral phlebitis of upper extremities in puerperium. Patient II-para, 30 years of age. In third week following childbirth, sudden fever, pain, and thickening in area of veins, first of left arm then also of right arm, with oedema from finger-tips to axillæ. The lower extremities were intact. Repeated pulmonary embolism. Death on twenty-eighth day after delivery. A autopsy showed arm-veins up to the elbow as well as both cephalic veins filled with extensive blood-clot.

DICKINSON and HUBERT. A case of Raynaud's gangrene in connection with parturition. *T. Clin. Soc.*, Lond., 54, xxxi, 6

CASE. Patient 42 years old, VII-para. Previously had symptoms of Raynaud's disease in the fingers of both hands. "After immersion in cold water her fingers would turn white and numb and then blue and painful. Two days after last confinement all the finger tips and both thumbs became itchy and painful. Discoloration followed and finally turned bluish-black. A few days later

the toes were attacked the same way. Rough systolic murmur. Finally line of demarcation formed and some of the fingers were allowed to fall off, no operation being performed. (This is pure case of Raynaud's disease.)

CASE 2. Patient 44 years old IX-para, last child still-born. Three months afterward symmetrical gangrene of fingers, toes, and ears. No subsequent history.

These two cases as well as Case 15 in Raynaud's original thesis and Begg's case, show a more or less close connection between symmetrical gangrene and parturition.

FRANKEL, L. Ueber spontane puerperale Gangraen beider oberer Extremitäten. *Monatsschr. f. Geburtsh. u. Gynaek.*, 903 xlii 78

The patient was primipara 24 years old. Spontaneous labor followed by persistent fever. On the twelfth day of the puerperium no arterial pulsation could be felt along the entire left arm, which was colder than normal, lightly discolored and swollen. Two days later the pulse had also entirely disappeared in the right arm. Death on the next day (15th). No autopsy. The clinical course of the case indicated pure septicæmia, without a clinically demonstrable localization. No lesion of pelvic organs. Complete blockage of the arteries of the upper extremities.

OSTERLOW. *Gynaek. Gesellsch. zu Dresden* reported in *Zentralbl. f. Gynaek.*, 90, N. 7, 440.

Report of case of bilateral embolic mastitis. Patient was admitted to hospital in state of pronounced septic infection and promptly succumbed to the disease. She had moreover an abscess in the right lobe of the thyroid gland, and gangrene of the third phalanx of the fourth finger of the right hand, and the fifth finger of the left hand.

POROW. Gangraen der oberen Extremitäten im Puerperium. *J. f. Geburtsh. u. Gynaek.*, 909, No. 8 (Russian). *Zentralbl. f. Gynaek.*, 90, No. 47, 1459.

Primipara age 36 years, came under observation on eleventh day of puerperium, after normal and easy labor left arm was discolored almost up to elbow covered with vesicles, cold, without sensation or motion; right arm was similarly changed on anterior surface of the forearm and in region of the fourth, fifth, and in part of the third finger. Rise of temperature had begun since fourth day of puerperium and patient noted first red, then purplish spots, with pain, in the arms, as outlined above. Lines of demarcation began to form on twentieth day after delivery and the left arm was amputated at the upper third of the humerus. Resection of gangrenous portions of right arm followed by transplantation of skin on the granulating surface. Patient made good recovery. Old emboli were found in the left radial and ulnar artery and a similar embolus was assumed in the right ulnar artery. The arterial walls were entirely unchanged. The veins were entirely permeable and empty. There had been no cardiac symptoms at any time, and there was no evidence of endocarditis. The emboli were therefore assumed to be derived from the uterine veins, hence they reached the general circulation through patent foramen ovale.

SCHULZ, R. *Mittl. u. d. med. Abt. d. k. k. Krankenh. zu Braunschweig*. *Deutsch. Arch. f. klin. Med.* 84, xxxv, 86.

Primipara, age 5 years, premature labor (7 months) at end of third week of typhoid fever. Soon afterward, after severe collapse, paronychia and tingling sensations first in feet then in finger tips, with swelling of legs. In part

superficial, in part deep gangrene of circumscribed skin areas in exactly symmetrical localities of the legs, upper and lower arms and chest. The fingers and toes were not gangrenous. Moderate pain in the affected limbs. No evidence of thrombosis, no thrombotic strands could be palpated. Recovery. The condition is referred by the observer to post-typhoid anemia and resulting nutritional disturbances in the central nervous system.

SEIDELMAN Deutscher Zeitschr. f. Nervenh. 1904 xvii, 114.

Case of symmetrical gangrene of the upper extremities after pneumonia in a woman 29 years of age who about three weeks previously had been delivered of twins. Although the attack of pneumonia is credited by the observers with the responsibility for the onset of the gangrene he admits that puerperal etiology cannot be altogether excluded in view of the relatively recent childbirth.

ZARODNIK Ernst Ueber Gangraen im Puerperium. Ergebn. d. Gynaek. 9 4 252

The following case is identical with that briefly reported by v. Guggenberger in Verhandl. d. deutsch. Gesellsch. f. Gynaek., xv Cong. vol. II, 23

Patient 26 years old, II-para. Three days after normal confinement chills and high temperature. On the ninth day very pronounced pains in the whole of right arm, edema of same. A few days later cessation of pulse in ulnar and radial, no sensibility. First livid discoloration, finally bluish black color. Small vesicles on epidermis. Marked odor. Blood culture, hemolytic diplococci Gram positive. On fourteenth day after confinement systolic murmur. On seventeenth day after confinement amputation in the middle of the humerus for gangrene. Subsequently patient went through a very serious pyemia but finally left the hospital cured.

Examination of amputated arm. The brachial artery is patent about 5 cm. below its bifurcation. There is an embolus to be found in the radial as well as in the ulnar artery occluding these two vessels entirely. Bacteriological examination of these emboli shows diplococci, Gram positive.

Author thinks that in this case the embolism was due to an existing endocarditis.

C. GANGRENE AFTER ABORTION—UPPER AND LOWER EXTREMITIES

ANDRÉOUDAS. Gangrène des membres inférieurs pendant les suites de couches. Ann. Soc. d'obst. de France 190 159

Author's second observation (Lacouche's case). Patient, IV-para 4 years of age with aortic stenosis, abortion at the sixth month. Two weeks later sudden severe pains in right groin, examination showed diminished temperature of leg and absence of femoral pulsation. Gangrene of the entire leg followed, leading to death on the tenth day. No autopsy.

BÉLOUX and ANDRÉOUDAS. Infection post-abortive endocardite végétante, embolie gangrène d'un membre inférieur amputation, mort. Rev. mens. de gynéc. obst. et ped. de Bordeaux, 1907 p 10

The author's observation concerned a young woman 26 years of age who after early abortion was attacked about two weeks later by extremely severe pain of sudden onset especially marked in the right lower extremity but also involving the left. Hazy and purplish discoloration especially of right leg; this was cold more particularly at the level of the foot, no arterial pulsation in pedal and

femoral artery, on the left side the pedal artery was practically not felt, but the femoral pulsated normally. Progressive gangrene first appearing in the distal part of the right foot and on the right leg rapidly tending to a considerable portion of the foot and distal aspect of the leg as far as below the knee. The thigh remained warm and of normal color as far as three finger widths above the knee. Amputation at middle thigh (radial rest of pulsation in the left femoral artery with appearance of large ecchymoses up to the knee.

Death 5 days after birth. Autopsy showed the presence of vegetative endocarditis affecting the mitral valve and through the pericardium the myocardium giving rise to the emboli and repeated gangrene.

OLKE. Cited by Simpson. Selected Obst. and Gynec. Works. 18 1 p 541

Patient age 24 years. Abortion about 3 months. On the 11th day she was seized with severe headache, giddiness, dimming of vision and vomiting. No great was the interruption to the work that she could distinguish the hand of a mirror. The fingers of the left hand felt as though they were dead and were extremely painful. On the following day the dimming of vision continued and there was intense pain in the fingers of the left arm which at length became cold and insensible to external impressions. The rest and the tips of the fingers were discolored.

On examination no pulsation could be felt in any of the arteries of the arm above the affected hand but the subclavian was distinctly felt pulsating above the clavicle. There was perceptible disturbance of the function of the heart and embarrassment of the respiration. This patient eventually recovered with the loss of gangrene only of the interphalangeal of the thumb and fingers of the left hand. In three days the power of vision was restored. The pulsation never returned in the obliterated arteries of the left arm but the arm itself gradually regained its sensibility and returned plumpness. Heart normal.

D. GANGRENE DURING PREGNANCY

POWELL. Gangraena sporadica digiti minimi manus dexterae in gravida enucleata. Bericht d. k. k. Kran. krankenst. d. polib-Spitalung in Wien 1884 p 412

Case of spontaneous dry gangrene of the little finger of the right hand in a young otherwise healthy pregnant woman. Patient a woman 28 years of age eight days before admission to the hospital was suddenly attacked by pain with reddening of the right little finger, the redness promptly subsided and the finger turned black. On examination this entire finger was seen to be black, mummified and dry up to the metacarpophalangeal joint. There was a distinct line of demarcation of the boundary of the gangrene. Two days later the gangrenous finger was removed. The entire process had no injurious influence on the course of the pregnancy, which was at the seventh month when the patient first came under observation.

JARDINE. A case of gangrene of the leg from thrombosis during pregnancy. J. Obst. & Gynec. Brit. Emp., 1903 March p 90

Primipara age 24 years came under observation in last month of pregnancy. In good health until eight days ago when pain appeared in the right foot and leg with spasms and tingling sensations. The pains progressively increased in severity and at the time of admission to the hospital the right foot and leg were pale, cold and bloodless. No pulsation in artery of leg, weak pulsation in popliteal

space. Two days after admission forceps delivery of hydrocephalic child which died 10 hours later. Numbness could be felt in the femoral artery and the thigh was very cold to the touch. Vesicles formed and the line of demarcation made its appearance just above the knee. High amputation of thigh. All vessels of the stump were thrombotic. The amputation flap became gangrenous and was destroyed. Pain, coldness, and absence of pulsation were likewise noted in the left leg a few days, but the phenomena subsided again. The cause of the thrombosis could not be discovered, the cardiac condition could not have caused it, is the author's opinion.

MUTZLER. Handb. d. Geburtsh., vol. II p. 935.

Patient 34 years old, 1 para. 7 five years previous ulcers crabs on right leg. Eight weeks before confinement chills and fever. Eight weeks later new chills and pains in right leg. Finally gangrene set in on right foot and leg. This condition the patient was admitted to the clinic. Forceps delivery. Death 4 days later.

Post-mortem examination showed no thrombi in the larger vessels but old thin thrombi were found in the muscular veins of the legs. Nothing is stated about the arteries.

SWAYNE. Gangrene of the thigh during the seventh month of pregnancy. T. Obst. Soc. Lond. 584, xiv. 5.

Swayne relates case occurring during the seventh month of pregnancy. The disease came on after long journey and attacked the integuments and muscles over the space of the size of a man's foot on the upper and inner third of the right thigh. The symptoms had existed about four days before the occurrence of premature labor but were not very severe until after delivery when they became much intensified and proved fatal early on the third day. There was no injury, wound, or erysipelatous inflammation to account for the occurrence.

E. GANGRENE AFTER GYNECOLOGICAL OPERATIONS

CHATEL. Des Gangrènes en général et en particulier des gangrènes des extrémités. Thèse de doct. de Paris, 904.

CASE. Gangrene of right arm following laparotomy for removal of sarcoma of the left ovary. Patient woman of 35 years of age. Right hand and forearm became cold and painful on third day after the operation, and on the eighth day the arm was amputated, the upper third (level of surgical neck). Not a drop of blood escaped from the gaping brachial artery in the stump. The vessels were ligated, although the condition was evidently hopeless, the arterial obliteration involving the axillary or the subclavian. Death four hours after the operation. Autopsy.

CASE. Death through gangrene of the entire left extremity following an abdominal operation. Patient woman 50 years of age. Difficult removal of multiple fibroma complicated by double aneurysms. On the evening of the operation, the patient began to complain of pain in the heel, promptly ascending to the root of the thigh. The entire limb became cold and lifeless. By the next morning the leg presented all the characteristics of arterial gangrene. There were no unfavorable symptoms on the part of the abdomen. On the following night the patient complained of some stiffness in the other leg and she died on the morning of the third day. Autopsy findings. Complete thrombosis of the arteries of the left limb, reaching as far as the aorta and extending also into the hypogastric artery. On the right side, clot connected

with the above clot at the bifurcation of the aorta) occupied the common iliac, but topped at the bifurcation of the iliac arteries, which were permeable. No perforating.

JESSITT. J. Obst. & Gynec. Brit. Emp., 904, vi, p. 8.

Gangrene of the leg, after abdominal hysterectomy for myoma weighing 25½ pounds. The leg became cold soon after the operation and the line of demarcation formed above the patella. Amputation of the leg fourteen days after the first operation. Death four days later. Autopsy showed thrombosis of the external iliac and nephritis. Each had not been present at the time of the first operation. The gangrene had been dry throughout.

ROUX DE BEUX. Les Accidents Gangréneux symptomatiques des extrémités consécutifs à une infection purulente. Marseille, 1900, xiv, 577.

Jahrbuch f. Chir. u. g. 21, p. 236.

Abdominal hysterectomy for severe puerperal infection. On the day of the operation bluish discoloration of the ends of the first three toes in both feet, followed by development of asymmetrical gangrene. Amputation after line of demarcation had formed. Recovery. Patient is primipara 16½ years of age. The hysterectomy served as the aseptic procedure in this case of non-localized septicemia.

ADDENDA

Through the great courtesy of Dr. Howard Lillenthal of this city I am able to add an interesting case of his to my paper and want to take this opportunity of expressing my appreciation to him. His case is the fifth of gangrene after gynecological operations and the seventy-sixth in the whole series.

H. Lillenthal's case. Post-operative embolic gangrene of fingers amputation of fingers.

Mrs. R. H., 8 years old, entered Mt. Sinai Hospital on December 26, 1905. Temperature 99.5, pulse 100, respiration 14. Thirteen years before she had had post-operative sepsis. Five years before she had been operated upon at Mt. Sinai Hospital for dysmenorrhea. Four months before her appendix and right ovary had been removed in a hospital in another city and ventral suspension had been done. At the same time an exploration of the upper abdomen had been made. The patient stated that gastrotomy had been performed but as to this there is some doubt.

Menstruation had begun when the patient was 4 years old and for 3 years before admission had been very painful.

About ten days after the last operation there was sudden pain and tingling of the ends of the fingers of her left hand two days later the skin of the hand and fingers began to change color then dry gangrene of the fingers and of the end of the thumb developed. Her physician told her that he found sugar in her urine. There was loss of 51.30 pounds in weight during the past month. The patient was in a very feeble and run-down condition on admission to the

HAR MORIAH HOSPITAL

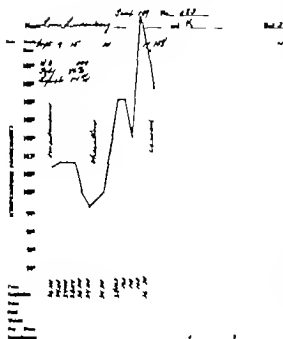


Chart Case 1

convulsion which lasted fifteen minutes the pulse became imperceptible, and at 11 a.m. the child died.

Much to my regret we were unable to obtain a post mortem examination but from past experience, I have not the slightest doubt, that this was an authentic case of heatstroke.

At this point it is only proper to call attention to the fact, that during the first half of September 1915 New York City was suffering from a heat wave of unusual length and severity. September 10 in particular is featured by the *New York Sun* as being almost the hottest day of the year.

On the same day I was invited by Dr. Eli Moschowitz, Pathologist to Beth Israel Hospital, to witness the autopsies of two patients who died with unexplained high post-operative temperatures. The autopsy did not reveal anything unusual, and certainly nothing to explain the high temperatures. It was the pathologist's opinion, that both patients died of post-operative heatstroke. I am greatly indebted to Dr. Harry E. Isaacs, Attending Surgeon to Beth Israel Hospital, for his permission to incorporate a brief history of these two cases.

CASE 2: Ike R. age 38 was admitted September 6, 1915. During the preceding six years the patient had been suffering from frequent attacks of pain in the right lumbar region, which radiated downward and inward. Lately similar attacks occurred upon the left side also for two days prior to his admission to the hospital, the patient vomited very frequently and his bowels moved only with the aid of enemas. The urination was not increased in frequency.

On physical examination there was elicited tenderness on deep pressure over the entire abdomen particularly marked in the vicinity of the umbilicus. In other respects the physical examination was of no importance.

The patient was operated upon by Dr. Isaacs September 8, at 5 p.m. Abdominal incision was made through the left rectus, five inches in length. The omentum was adherent to the sigmoid flexure. On separating the adhesions the omentum was found to contain an abscess; this portion of it was therefore resected and a cigarette drain was inserted to the sigmoid flexure. The wound was closed in layers.

Even before the operation the patient had been running a temperature up to 103° F. therefore a post operative rise to 103° F on the following morning was not very surprising. However, barring an intercurrent drop of two and one-half degrees for a few hours in the afternoon, the temperature continued to rise reaching 107.8° F at 6 p.m. of the following day and shortly thereafter the patient died (Chart 2).

A careful autopsy was performed a few hours later and following anatomical diagnosis established. Chronic congestion of lungs, with acute hypostasis chronic congestion of liver chronic congestion of spleen chronic congestion of kidneys localized peritonitis in the region of the sigmoid flexure. In the absence of any findings explanatory of the high temperature, the pathologist arrived at the diagnosis of post-operative heat stroke.

CASE 3: Gusale G. age 30 was admitted September 6, 1915, to Beth Israel Hospital. Patient was operated upon one year ago for cholelithiasis no relief however was obtained on the contrary the operation was followed by jaundice which had not existed before. Operation September 8, 1915, by Dr. H. E. Isaacs. Exposure of the common duct through a five inch longitudinal incision in the right hypochondrium. Enormous adhesions were encountered, which made the exposure of the duct somewhat tedious. The common duct was found to be distended and to contain several calculi after incision of the duct these were removed. Drainage by two tubes, one leading into the hepatic duct and the second into the common duct toward the papilla of Vater.

Name *Mr. Robin*
 Ward *Long* D.M. *Long*
 H.S.

BETH ISRAEL HOSPITAL

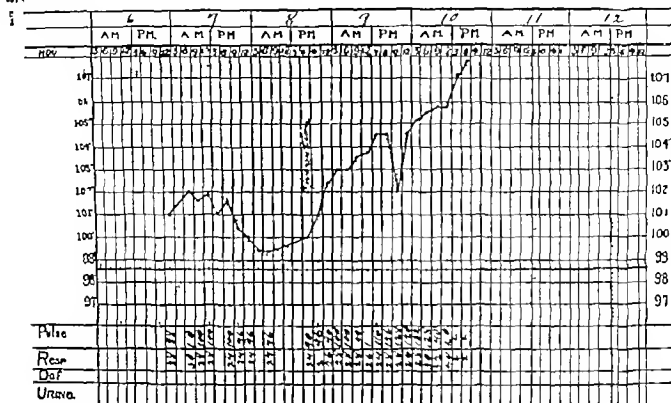
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Chart 3 Case 2

After the operation the temperature began to rise slowly but steadily it reached 103° F next morning 104° F in the evening 105° F next morning and a few hours later the patient died with a temperature of 106° 8' F (Chart 3)

An autopsy was held on the same day and the following anatomical diagnosis was made by the pathologist. Recent choledochostomy with recent localized peritonitis brown pigmentation of the myocardium chronic congestion of the liver with fatty infiltration acute hyperplasia of the spleen chronic pancreatitis chronic congestion of the kidneys with parenchymatous nephritis

In view of these findings and in view of the fact that the patient died thirty six hours after operation with a temperature of 106° 8' F it was the pathologist's opinion that the cause of death was heatstroke.

I have been on active summer service at Mount Sinai Hospital regularly every year from 1899 to 1914 and have often had the impression that during particularly hot weather some of my patients suffered from a mild insolation however I find in my histories only the following case reported as an

actual and undoubted case of post-operative heatstroke

CASE 4 Benjamin A. Russian age 34 was admitted to Mount Sinai Hospital August 7 1900. His principal complaints were cyanosis and pain of the foot he has had a number of intractable ulcers in the vicinity of the toes, resulting progressively in their total loss. He was treated at that time for Raynaud's disease but there is no doubt that he was suffering from what we now designate as thrombo-angitis obliterans.

The pain was so severe that I finally acceded to the wishes of the patient and consented to amputate the leg. Amputation August 11 1900 through the knee joint by the Ssabanjeff method. The patient did not react well from the operation and he was also noisier than usual. One and one half hours after operation the temperature rose to 104° F four hours later the temperature was 108° 2' F. The patient was in a stuporous condition the skin was hot and dry. Insolation was suspected therefore an ice pack was ordered. The pulse became imperceptible and was apparently uninfused by active stimulation. The patient died seven hours and forty minutes after operation with a temperature of 106° 5' F (Chart 4)

Autopsy twenty hours post mortem showed all

Name *James Grand*
 Ward *F 5* - Dept. *Surg*
 M.S.

BETH ISRAEL HOSPITAL

Admitted

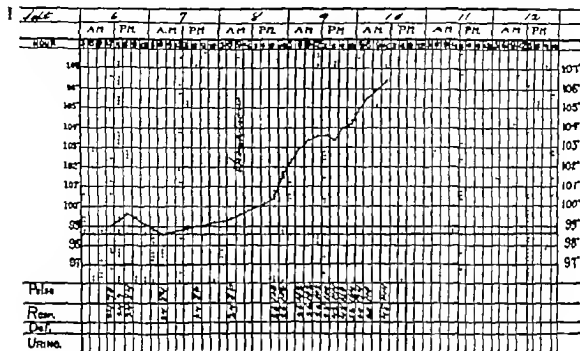


Chart 3 Case 1

the organs normal with the exception of chronic parenchymatous nephritis of slight degree. Examination of the brain showed a marked congestion of the vessels upon the surface of the brain. Some increase of the cerebrospinal fluid, with dilatation of both ventricles. Cut section of the brain showed a congestion of the vessels. The sinuses of the dura were found to be normal. At that time we looked upon these findings, as distinctly corroborative of our diagnosis of post-operative heatstroke.

The summer of 1900 must have been a particularly severe one as regards heat and humidity because the only medical article published with post-operative heatstroke as its subject dates back to that year. I refer to Gibson (1) who reports two cases of post-operative heatstroke which occurred during the preceding summer in his service at St. Luke's Hospital. The history of these two cases is the following:

CASE 5. Walter O. C. age 3 was admitted June 1, 1900, with an attack of appendicitis of moderate severity. Temperature 101°F pulse 120. Immediate operation in gas and ether anesthesia.

gangrenous appendix was found and extirpated gauze draining partial suture of wound. Immediate recovery was good until the afternoon of the next day when the symptoms were such as to cause the gravest anxiety. The temperature was 104°F pulse 48 and very poor countenance pinched color ashy grey-blue skin hot and dry some delirium. The condition of the wound was perfect. Ice packs and alcohol sponge baths reduced the temperature whereupon the delirium also ceased and was followed by a refreshing sleep. The case thereafter terminated in a prompt convalescence.

CASE 6. Charles Van E. was admitted to St. Luke's Hospital with an acute pericarditis. The patient was extremely obese weighing more than three hundred pounds. Heart action feeble and intermittent. Temperature 104°F. Immediate operation evacuation and drainage of a huge abscess, and extirpation of gangrenous appendix. One and one half hours after operation the temperature rose to 103°F. Ice packs and an ice coil to the abdomen and head brought the temperature down to 100°F thereafter the temperature fluctuated between 100°F and 101°F and was very probably due to absorption from the abscess cavity. Two weeks later the patient was considered to be convalescent when he suddenly died. Autopsy showed the death to be due to the cardiac condition.

Gibson read the paper at a meeting of the Surgical Section of the New York Academy of Medicine November 1, 1900. The paper as reported in the *Journal of the American Medical Association*¹ created considerable discussion as is evidenced by the following additional case reports:

CASE 8 and 9 Johnson reports a case in a child, of excision of a cicatrix from the lower lip with a single skin graft. The temperature of the operating room on that particular day was 10° F. Within a few hours after the operation the temperature of the child rose to 105° F. death occurred the same night. A few days later Johnson had two similar cases but this time prompt treatment with ice packs was instituted and was followed by recovery.

CASE 10 Brewer reported a case of extirpation of the tonsil for carcinoma. The temperature of the operating room was 90° F. Two hours after operation the temperature of the patient rose to 104° F. and the pulse to 150. There was also delirium. Prompt treatment with ice packs was followed by recovery.

Crandon and Ehrenfried state that they have seen three cases of post-operative heat or sunstroke. The history of the following case only is given:

CASE 11 Boy 23 years of age was admitted with an acute appendicitis of three days duration. Temperature 103° F. pulse 100. The street temperature in Boston on that day was 100-101° F. with excessive humidity. Immediate operation a gangrenous appendix with a large abscess was found. The condition of the patient was very good on leaving the operating table. One hour later however there was a sudden rise of the temperature to 104° F. and the pulse to 180. The skin was dry and red, the tongue and lips were dry. The eyes were glistening, the patient was irrational. Ice packs brought the temperature down to 100° F. in twenty-four hours thereafter convalescence was normal.

I am indebted to Dr. Cunniffe for the history of the following unpublished case of post-operative heatstroke:

CASE 12 Miss C. while visiting in the country, was suddenly seized with severe general abdominal pains which soon became localized in the right iliac fossa. Six hours later she was seen by her physician who diagnosed an acute appendicitis and referred the patient to Dr. Cunniffe for immediate operation. The patient was transferred to a sanitarium, a distance of eight miles in an open automobile without adequate protection from the sun, on July 4, one of the hottest days of the summer of 1912.

THE MOUNT SINAI HOSPITAL

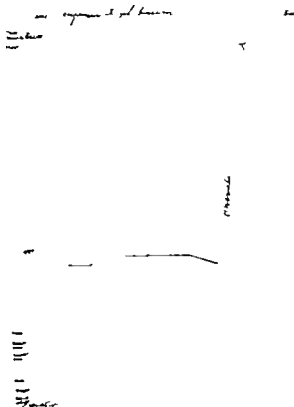


FIGURE 1

The patient was operated upon at 4 p.m. Intermuscular incision was made. On incising the peritoneum a small amount of serous fluid was found. A swollen and congested appendix was extirpated, the wound was closed without drainage. The patient was returned to her room at 4:40 p.m. in good condition. Two hours later the temperature of the patient rose to 100.5° F. A diagnosis of heat stroke was made and prompt treatment with ice packs instituted. The temperature remained very high throughout that night. On the following day it ranged from 101 to 102° F. and did not reach the normal until July 6. The wound healed by perfect primary union.

The literature dealing with the symptom complex caused by exposure either to the direct rays of the sun or to high degrees of artificial heat is exceedingly voluminous. The references appended to Steinhauser's monograph *Verensystem und Insolation*⁴ cover over twenty-two closely printed pages and in addition the statement is also found that only the newer literature approximately that after 1850 has been considered. However even with such a wealth of material

Berlin, Aug. Hirschwald 1912.

there exists no unanimity regarding the disease. After a very careful study of the more important contributions to the subject I have arrived at the conclusion that our knowledge as to the etiology symptomatology pathology and treatment of the disease is in a chaotic state. If this is true of heatstroke or sunstroke in a general sense a disease so common as to be at times epidemic or endemic in nature, how much more likely is it to be true of that small and selected group which particularly interests us at present, namely post-operative heat or sunstroke. Altogether as is seen, there have been reported in the literature only the two cases of Gibson a few more were mentioned in the discussion of Gibson's paper. Three additional cases were mentioned casually in a textbook dealing with post-operative treatment. Thanks to the courtesy of my colleagues, and from my own experience I am able to add five more cases. In other words, a total of barely twelve cases scattered through more than fifteen years, is all that is available for study. My personal experience is limited to two positive cases and a third doubtful one certainly an insufficient number to entitle me to discuss authoritatively the many moot problems, where others with a wealth of material have failed and yet even with this limited material, I have gained certain well founded impressions which I consider worthy of record.

The most prolific contributors to the subject of insolation have been the military and naval surgeons of the United States, Great Britain and Germany. All of these, as well as the civilian recorders of certain large epidemics in New York, Philadelphia, and Boston appear to be agreed that there exist various forms of insolation. All writers differentiate clinically at least two forms, namely sun or heat-stroke and heat prostration. A few authors describe also a third form, "heat exhaustion" so called.

As near as I can gather from the observations of the best authorities sunstroke is characterized by the following more important attributes, in addition to other less important, or secondary attributes. There is always a history of direct exposure to the sun and of

an abrupt onset, with complete loss of consciousness. The integument is, as a rule, hot and dry and flushed. The body temperature is very high the pulse is full and of high tension. On the other hand in heat prostration these symptoms are either lacking or their exact antithesis is present. Thus we find that there is no history of direct exposure to the sun but on the contrary a history of being confined in a close, poorly ventilated room, and perhaps of exposure to artificial heat. The best examples of this form of insolation occur in stokers on steamers, and may occur even when the outside temperature is far below what is usually termed hot. The onset is gradual and consciousness is usually retained. The skin is not hot, dry and flushed, but on the contrary is cold clammy and pale. The temperature in these cases is variable it may be either normal or subnormal or may even be elevated but in instances of the latter it never attains the height it attains in cases of sunstroke, rarely going over 102° F. The pulse, in contradistinction to the former is weak and thready.

Let us now see how far cases of post-operative insolation correspond to these requirements.

If we except the case of Dr. Cunniffe the case that on the day of the operation rode to the sanitarium in an open automobile, inadequately protected from the rays of the sun all of the cases reported had been sick either at home or in a hospital for a number of days prior to the operation and were therefore at no time exposed directly to the sun. Assuming now that the symptomatology previously discussed is correct, it should follow also that cases of post-operative insolation are not cases of heatstroke but of heat prostration.

Nothing definite can be said regarding the rate of onset of the disease because all cases of post-operative insolation were operated upon in general anesthesia therefore the rapidity of the onset, or the lack of it cannot be estimated at its true value. By the time the patient has fully reacted from the anesthesia, the disease may already be far advanced, or it may have just begun.

In most of the cases in which the integu-

ment is mentioned at all we find it stated that the skin of the patient was very hot and dry in one or two a peculiar cyanosis is mentioned. This therefore would be a symptom which is certainly more characteristic of heatstroke than of heat prostration.

I fear that not much reliance can be placed upon the quality character or rate of the pulse. Soon after an anesthesia with its complicating nausea and vomiting the rate and character of the pulse is apt to vary to such an extent, as to detract from its value as a differentiating guide.

In all of the reported cases however we find it emphasized that the body temperature was extraordinarily high we thus find recorded the following temperatures 109 108.2 108.2 108° 107 106.8° 105 and 104 as a matter of fact it might be said that it is practically only upon the presence of these excessively high temperatures and even in the absence of any or all symptoms, that the diagnosis of post operative insolation has usually been made. The registration of the temperature by a thermometer is so exact and so absolutely uninfluenced by the personal equation of the observer that we must look upon it as absolutely reliable in every respect. Judging from the high temperature alone it would follow that all of the cases hitherto observed or recorded belong in the group of heatstroke and not heat prostration.

Almost involuntarily however there arises the question as to whether the above conclusion that all cases of post operative insolation are cases of heatstroke and not of heat prostration and it is a justifiable one. Let me for the sake of argument mention the following hypothetical case. A patient is operated upon let us say for an acute gangrenous appendicitis with abscess six hours after operation the temperature may be either normal subnormal or slightly elevated the skin is cold clammy and pale the pulse is weak and thready and finally let us assume that this operation took place on a hot July or August day. Upon the following day the condition either persists or it is already improved. Ultimately the case recovers without any sequelæ or the case dies within the

first forty-eight hours. There is not a surgeon who has not seen such cases. No one ever thinks of making any other diagnosis than that of mild post-operative shock or ordinary rather severe post-operative reaction and yet are not the hypothetical symptoms just enumerated and the history and course characteristic of so-called heat prostration? I wonder how frequently these cases are overlooked is it not probable that this is the most frequent form of post operative insolation more particularly as it is the form which is more likely to occur in the absence of direct exposure to the sun?

It is not at all remarkable that the few cases of post operative insolation have been recorded in two cities only namely Boston and New York. As I believe these two cities with the addition of Philadelphia record also the greatest number of endemic or epidemic heat prostrations. I do not suppose that there is anything in the geographical location of these cities to account for the greater frequency as even the larger cities further south with presumably higher temperatures fail to report as many cases in proportion. It is perhaps possible to account for the greater frequency of heatstroke in these three cities by the fact that they are more compactly built up and that it is in these cities only that many of the inhabitants live crowded together in tenements.

Trivial as it may appear I believe a second important reason for the greater frequency of heat prostration in these cities is to be looked for in the fact that their population has not as yet learned to dress properly during the summer. I believe in fact I know that most of the people wear too much too heavy too dark and too woolly clothing and I am also convinced that all of these are conducive to the production of heat insolation.

I also believe that the suggestions just made have an important bearing on the question of the production of post-operative heatstroke. The real hot days of the year are in the very smallest minority in New York City the great majority of the days of the year are either cold or verge at least upon coolness. On this account surgeons have learned to fear so much the occurrence of

post-operative pneumonia that they try to avoid it by instructing their nursing staff to be sure to cover the patient well in the operating room upon the transport to and from the operating room and upon the arrival in bed. This has become a sort of fetish and an inviolable rule. I have not the slightest doubt that this needless superheating of the patient is conducive in a great measure, to the occurrence of post-operative insolation.

It was my intention to fortify my standpoint regarding post-operative heatstroke by quoting the unusually high temperatures of New York City on those particular dates. In this however I was doomed to disappointment. I consulted the files of the *New York Sun* upon the four dates upon which cases of post-operative insolation are known to have occurred and was rather surprised to find that with the exception of September 10 1915 on which a temperature of 90° F was recorded the temperature on the other dates was considerably below that namely 83° F June 1 1900 89° F Aug 7 1900 and 83° F July 4 1912. A little reflection soon convinced me of my error. It was well known to me that the deleterious effects of the heat are due not so much to the excessive height of the temperature on a particular date but more to a long continued term of fairly high temperature with a very high percentage of humidity and absence of any breeze in other words what is commonly called a heat wave. The longer the atmospheric conditions just described exist, the greater will be the number of heat prostrations. When I again consulted the files of the daily press upon the dates mentioned from this viewpoint, I found just the conditions described and also that they had been in existence for some time preceding that date.

TREATMENT

Whenever the atmospheric conditions are favorable for the production of insolation, all operating room activities should cease with the exception of those of an urgent nature. It is quite within the range of possibility that insolation may occur even in a non-operated individual but the exhaustion dependent upon the operation is lacking and may be just

the factor which determines the occurrence of insolation and the success or failure of treatment instituted.

In all cases operated upon during a wave, the greatest regard should be had to the comfort of the patient. As already indicated all the needless swathing in blankets and hot water bottles is to be prohibited. On the contrary at such times coolness the lightest of covers are indicated. Morphine is also in order and desirable. Cool drinks should be permitted much earlier than is generally the custom after operations.

It has already been pointed out that not far only that particular form of insolation which is characterized by very high temperatures and which is called heatstroke has been recognized as a post-operative complication. This is perhaps due to a lack of our diagnostic acumen as it is quite possible that the second variety or heat prostration so called, is the more frequent. While the etiological factor appears to be identical in both, they differ widely in their symptomatology and what is of the greatest importance also in the therapy.

In heatstroke the temperature is so high that every effort should be made to reduce it and to nullify its deleterious effects. Unfortunately we cannot avail ourselves in the cases of the antipyretic properties of coal tar products on account of their depressing effect upon the heart. Recourse must be had therefore to physical measures to reduce the temperatures. The best of these is hydrotherapy properly executed and carried out in the form of sponge baths with water. An ice cap applied to the head is not only grateful to the patient, but materially aids in reducing the temperature and combating the delirium of the patient. Enemata or Murphy infusions with ice water coming into contact with a large volume of the superheated blood should also be tried and will also be followed by success. The form of treatment would, on the other hand, be entirely contra indicated in that variety of insolation which we call heat prostration. In this form the temperature is not only not elevated, but in many cases is even subnormal. The exact opposite form of treatment

therefore indicated namely the patient should be well covered and surrounded by hot water bottles subcutaneous or intravenous saline infusions, or warm rectal infusions are indicated.

The rate and quality of the pulse is to be controlled and forms a valuable guide as to the character and amount of stimulation called for

In a certain number of cases of insolation

there has been found a peculiar degeneration of the blood which manifests itself by a laking This suggests the possibility of venesection and blood transfusion provided a suitable donor can be found at short notice

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PERFORATION IN TYPHOID FEVER

WITH REPORT OF A CASE ASSOCIATED WITH ACUTE TYPHOID APPENDICITIS IN A CHILD
AGED 7 RECOVERY¹

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IN discussing this most important topic of surgery one cannot refrain from praising the courage of the early workers in this field. In 1884 von Leyden first proposed to treat the resulting peritonitis of typhoid fever through operative measures and at that time said

I cannot longer forbear mentioning something I have for a long time had in mind namely whether or not it is possible to treat peritonitis by operative measures. The idea is rational enough when one considers that suppurative peritonitis is very similar to suppurative pleuritis

Further he says

But I must leave it to the surgeons to determine whether it is possible to accomplish anything by operation in this condition, but one thing is certain, it seems to me that herein lies a most fruitful field for investigation.

During the same year appeared an article by the renowned Mikulicz in which he reported three cases of peritonitis treated surgically and there is little doubt that one of them was a perforated typhoid ulcer. While there is some doubt as to the authenticity of this case there is no doubt that Mikulicz's great teaching encouraged the surgical treatment of peritonitis

Lucke and Kussmaul however seem to receive the credit of being the first to have

operated on and reported an authenticated case of perforation. During the same year Bontecou reported a case. To Professor J. C. Wilson in 1886 is given the credit of being the first writer on the subject in the English literature and at that time he made the following statement

Granted that the chances of a successful issue are against you that the lesion of the gut may be very extensive that the vital forces are at a low ebb nevertheless the courage to perform it will come of the knowledge that the only alternative is the patient's death

As early as 1762 A. G. Richter of Vienna suggested the advisability of draining the peritoneal cavity for suppurative peritonitis. Among early writers on the subject especially are to be mentioned Keen, Cushing, Finney, Van Hook and others. In 1898 Keen published his extensive monograph Surgical Complications and Sequels of Typhoid Fever in which he reported a collection of 83 cases from the literature and in 1899 collected 75 additional cases making a total of 158 cases operated on with a mortality of 76.59 per cent the mortality of non-operative cases being quoted by Murchison as 95 per cent. At this time Keen made the following statement

The earlier the moment at which the operation can be done after the immediate shock of the perforation (provided, of course, there has been any as is sometimes not the case) the better it will be for the patient, every hour thereafter counts, since the infection of the peritoneum becomes more diffuse and intense.

In discussing the above, Cushing made the following reply

It is hard to understand Dr Keen's advocating delay until symptoms of shock have passed away and his preference of the second twelve hours for operating when one speculates that extravasation perhaps of virulent organisms is with all probability continuously taking place while we are waiting.

In Keen's statistics in which the time was given before operation the results were as follows

	No. of Cases	Died	Recovered
Operated on during first hours	36	29	7
Operated on during second hours	39	7	
Operated on after 24 hours	83	65	8

FREQUENCY OF PERFORATION FOUND AT AUTOPSY

The frequency of perforation varies greatly as is shown by the following statistics of various epidemics

In a series of 105 autopsies at Johns Hopkins Hospital perforation was found in 30 cases and occurred more frequently in ulcers with adherent sloughs. In Munich, in a series of 2 000 autopsies, perforation occurred in 57 per cent.

Author	Autopsies	Percentage
Murchison, 1st series	455	5.8
Cunhaumann	575	6
Heschel, Brouardel, Thoblot	667	7
Mackenzie	737	35.7
Murchison, 2d series	65	
Heschel, 1840-1849	27	4.4
Brouardel and Thoblot†	7	3
Griesinger	8	8
Oster	6,849	

Various London hospitals
†From English, French and German sources

The United States census reports of 1900 give the total deaths from typhoid fever as 35 379. As 12 per cent of the total death rate is shown to be due to perforation there died during that year in the United States 4,222 from perforation of the bowel.

FREQUENCY OF PERFORATION AS TO NUMBER OF CASES TREATED

	No. of Cases	Per centage
In Leipzig	1636	
In Hamburg	4004	6
Griesinger	600	3
Johns Hopkins Hospital	839	7
Murchison	580	3
McCrae, Montreal	77	6
Mackenzie, London	973	3.6
Hare and Bribbane	373	9
London and French Hospitals	2350	3.4
Scott, Philadelphia	3006	6

Total average—more than 3 per cent.

*Three recovered by operation

LOCATION OF PERFORATION

Author	Ileum	Colon	Appendix	Mitchell's diverticulum	Jejunum	Cecum	Rectum	Misc. O.
Including Oster's with those of Lambermester								
Mackenzie, and Fitz	506	56	3	4	4			
Cunhaumann, 64 cases	5							
Scott 30 cases	43		4					
Hawkins 7 cases	6	5	3			3		
Total	66	73	40	4	4	3		

The location of perforation relatively coincides with the studies of Baer as to the location of ulceration which is as follows

Item	No. of Cases	Per Cent
Ileum	13	89
Cecum	396	30.3
Jejunum	358	5.9
Ileocecal valve	89	6.7
Ascending colon	6	3
Transverse colon	6	4.5
Descending colon	6	6

TIME OF PERFORATION

Finney analyzed 112 cases with 66 perforations occurring as follows

20 during the second week.
36 during the third week.
9 during the fourth week.
The shortest period was four days.

In 193 cases Fitz found that perforation occurred in 88 cases during the second and third weeks, while 90 per cent of the remainder occurred during the fourth fifth, and sixth weeks.

Author	AGE					
	Less than 15	15-20	20-30	30-40	40-50	50-60
Finney	15	1	10-15	35	5	
Osler	8	3	0	15	0	6
Fitz		46		4		4

In Finney's series the youngest was 6 years. In Scott's series of 153 cases, only 5 were less than 15 years of age, the youngest being 8 years.

According to Curschmann, Topin, Rilliet, Rocher and Henoch, children under ten years of age are less prone to perforation, and that pathological study shows that the medullary swelling of Peyer patches and the solitary follicles is not so great as in adults, diarrhoea not so common and loughing not so marked, which undoubtedly explains the low percent age of perforation. This statement however is disputed by Jopson, who collected 45 cases of age being given in 44 as follows:

Age	Cases	Age	Cases
5	4		
6	4		
8		3	5
9		4	5
10	6	5	1

Total 44

In 217 cases among children collected by the same author perforation occurred 15 times or in 7 per cent as compared with the previous table in which perforation occurred in more than 3 per cent. Further one may note that only 21 of the 44 cases reported by him were under 10 years of age. The fact that only 1 case under 10 years of age could be found in the literature to 1909, the time of his article, proves in itself the infrequency in children. Griffith and Ostheimer in 302 cases under 15 years of age found perforation in 1 case, the youngest found in the literature.

SEX

In 444 cases Fitz reports 11 per cent in males and 9 per cent in females.

MORTALITY

Of 16 cases operated on at the Johns Hopkins Hospital between 1890 and 1900 6 recovered.

Keen's reports show 158 cases operated on with a mortality of 63.9 per cent.

In Jopson's series the type of disease was given in 51 cases as follows: mild 8, moderate 11 and severe 9. Of the mild recovered 3, died of the moderate 5 recovered, died of the severe 10, died 10— a mortality of a little more than 50 per cent.

Scott's report from the Pennsylvania Hospital were as follows:

	Age	Sex	Perforation	Recovery	Mortality
Males	11	5	4	3	3
Females	11	3	4	4	4
Total	22	8	8	7	1

Of the 11 cases reported by Scott recovered 7, the mortality being 36 per cent.

ETIOLOGY

Of the etiology that favours perforation we know comparatively little, however when one examines the bowel with ulceration almost to the peritoneum we wonder not that perforation occurs but rather at its infrequency. In children the lesions are not so marked as in adults, and especially in this true at the depth of the ulcer. Unquestionably this explains the infrequency of perforation in children.

Violent muscular movement and distention of the bowel may increase the danger of perforation. Perforation is more likely to occur in cases with diarrhoea as shown from the statistics of John Hopkins Hospital. Of 50 cases of perforation 30 had diarrhoea 16 at the time of perforation. This point becomes more forcible however when it is known that of 59 cases only 19 per cent had diarrhoea during the course of the disease. The time of the perforation coincides with the intensification of the lough and is demonstrated by the large percentage of cases occurring at the end of the second and during the third week.

Mechanical factors as meteorism especially if of sudden formation, solid contents forced movements as vomiting, dietary error causing increased peristalsis are important.

Perforation is more likely to occur between the ages of 18 and 40 while after 40 it is relatively infrequent.

SHEPPARD'S CASES

Case	Pain	Pulse Rate	Temperature	Leucocyte Count	Blood Pressure	Peristalsis	Vomiting	Collapse
1	Slight	80 to 170 4 1/2 hours, followed by fall 30	100. 1 104 in 3 hours later fall	5945 after 30 hours	88 to 5 hours Fall to 90	Slight	N	N
	Yes	80 to 50 3 hours	100 to 3 hours	3600 to 1 000 in 3 hours	94 1 in 3 hours	Decided	N	Yes
3	Slight	94 No change	1 104 in 7 hours, Fall 98.5 1 hours	8800 maximum	80 no change	Late	Yes	N
4	Yes	88 to 60 Running	98 97	Previous 600	Impossible to estimate	Yes	No	Extreme
5	Slight	61 50 hours	1 change	4500 maximum	93 no change	Slight	N	Late

Perforation is more frequent in men than women, which is explained perhaps partly by man's mode of living, the late observation of many cases and their impatience during convalescence.

The fact must be borne in mind that perforation may take place at any period of the disease and every patient should be carefully guarded.

SYMPTOMS

This grave complication occurs suddenly and very frequently unexpectedly; however it may be preceded by increased abdominal distention, colicky pain, borborygmus, diarrhoea, or hæmorrhage may be the warning sign. Six cases of hæmorrhage preceded 30 cases of perforation at Johns Hopkins Hospital.

At the time of perforation the patient (if mentally alert) is seized with a severe pain of rapid progressing intensity greatly increased by respiration passive or active motion and usually on palpation the greatest point of tenderness will be found in the region of the ileocaecal valve.

Pain in typhoid fever was studied by McCrea in 500 cases at Johns Hopkins Hospital. He found that about 40 per cent of the cases are free from both pain and tenderness and rather less than 20 per cent have tenderness. It was most constantly present with perforation usually sudden in onset severe in character and paroxysmal in occurrence.

Associated with pain are retching and vomiting the abdomen becomes progressively distended the walls become smooth and glistening respiration thoracic, and the paresis of the muscular layer of the intestine attains a high degree. The vomiting may become fecal in character and even suggest obstruction or ileus. The features assume a hypocratic expression the nose pinched the extremities cold and the face and body covered with a cold clammy perspiration. The pulse increases in rate becomes quite compressible and oftentimes thready.

The blood pressure was carefully studied by Crile and Sheppard. Crile found the highest systolic pressure in uncomplicated cases and with normal arteries as measured by a Riva Rocci sphygmomanometer in 115 cases of typhoid fever 138 mm. and the lowest 74 mm. The mean during the first week was 115 second week 106 third week 102 fourth week 96 and the fifth week 98 mm. The mean pressure of all the typhoid was 104 mm. In 20 cases of acute peritonitis recorded by the same observer with the same instrument and otherwise similar cases the highest was 208 mm. and the lowest 156 the mean 166 mm.

In 5 cases diagnosed as typhoid perforation in which pressure determinations were made (4 of these verified by operation or autopsy one case not operated on) the pressure rose from 116 to 190 mm. during a period

of four hours. The second case a lad of 12 years admitted with general peritonitis pressure 105. Vidal positive immediate operation later abdominal symptoms of peritonitis disappeared and the pressure fell to 80 mm. On the eighth day infection passed through the wall and peritonitis developed the pressure again rising promptly from 84 to 110. In the third case a slow perforation the pressure rose from 116 to 165 in two hours. The fourth case a physician entered the hospital with general peritonitis and blood pressure 165. No operation was performed. Autopsy disclosed perforation. Previous pressure unknown. A fifth case typhoid had pressure of 208. At operation perforation and diffuse peritonitis were found.

Sheppard's observation of 41 cases of typhoid fever near and during the fourth week, showed an average of 98 mm. The cases tabulated above, showing the various symptoms were reported by him and from them he deduced the following conclusions.

The pulse rate rises in almost all cases.

The blood pressure rises in most cases but may be difficult to obtain owing to extreme restlessness. Hemorrhage occurring simultaneously may greatly alter the blood pressure. Signs are most marked two hours after perforation and the blood pressure falls to the original level as rapidly as it rises. Sheppard also made blood pressure observations in the presence of distention pain increased leucocytosis and pulse rate and found no change except in one case of bronchitis. His final deduction is that a sudden rise in blood pressure is positive evidence of perforation while an unchanged pressure is not of negative value.

In the majority of cases there is an immediate elevation of temperature which in a very few hours is followed by a rapid fall. Rigidity and muscular spasms are not usually present to a marked degree immediately after rupture. Chills are rather a common symptom and is often followed by a cold perspiration. Leucocytosis is a very important symptom but to be of the highest value the blood picture must be studied frequently during the course of the disease.

Considerable importance has been given to

the disappearance of liver dulness as a symptom of perforation by some writers while others discredit it by stating it to be comparatively rare.

The Vidal reaction should be taken repeatedly in all suspicious cases of typhoid and will be of the utmost value if previously positive in a suspected case of perforation.

Hiccough if present is an important symptom because of its infrequency during the normal course of the disease and every patient should be examined also for the presence of the free fluid in abdominal cavity as a variable quantity may be present from the escape of liquid contents.

DIAGNOSIS

In arriving at a diagnosis a definite distinction should be made between the symptoms of immediate perforation and those due to the peritonitis resulting therefrom. Unless this all important distinction is thoroughly recognized we have deprived our patient of his chances of recovery. The attending physician must ever be on the alert in every case or suspicious case of typhoid to accomplish this distinction and the nurse or house physician in charge should be instructed to notify him immediately of any change in the symptomatology or condition of the patient. To be able to arrive at the proper conclusion one must especially have a clear clinical picture of the following conditions before him: acute appendicitis, hemorrhage, ileus, acute intestinal obstruction, acute pelvic infections, acute cholecystitis or cholelithiasis.

The diagnosis of acute appendicitis in most cases is comparatively easy. Too much stress cannot be emphasized in taking the history of every case offering difficulty in diagnosis when properly elicited if the patient be of moderate intelligence much valuable information can be obtained that will assist us in arriving at a proper conclusion. The pain of appendicitis not infrequently beginning in the epigastrium radiating over the entire abdomen greatly relieved for a time after the stomach has been emptied of its contents by vomiting followed by localized tenderness and rigidity over Burney's point.

absence of a Widal and with comparatively little disturbance of the pulse and temperature curve minus shock, will rule out appendicitis.

Of 717 cases treated at the Montreal General Hospital hæmorrhage occurred in 10 per cent. In hæmorrhage if severe, the pulse becomes rapid and compressible the blood pressure falls, the skin acquires a waxy pallor there is lividity and coldness of the limbs, the temperature is subnormal, and little or no pain. This presents a clinical picture that cannot be misconstrued.

In ileus or intestinal obstruction we not infrequently have a history of an inflammatory condition the presence of possibly strangulated hernia, or of a previous operation.

The first symptom to appear is a severe gripping pain more or less localized paroxysmal in character. The peristaltic wave can frequently be seen ending abruptly and, if obstruction is incomplete flatus and status may be forced through with a gurgling sound or if complete, obstinate constipation nausea, and vomiting are early and distressing symptoms. At first the normal stomach contents are ejected but soon this is followed by bile, dark fluids and later intestinal contents with fecal odor. The abdomen at first flaccid, soon becomes tympanitic the pulse increases rapidly becomes more or less thready the temperature may be subnormal and the patient presents the general picture of collapse however the symptoms as a whole develop less rapidly than do those of perforation.

The pain of pelvic lesions is usually more continuous, but not so severe except, perhaps, that of extra uterine pregnancy. Vomiting is not frequent in these conditions. The not infrequent bilateral condition, the tenderness and rigidity obtained by double palpation, the presence oftentimes of a mass in the pelvis associated with tenderness and rigidity of the vaginal vault, will easily rule out pelvic lesions of an inflammatory character while if we suspect extra uterine pregnancy the early signs of pregnancy collapse, associated with subnormal temperature absence of leucocytosis, the presence of uterine hæmorrhage and a fluctuating mass in the tubo-ovarian region will be valuable aids.

The not uncommon association of gall bladder infections and typhoid fever calls for special consideration. A study of the literature shows that perforation is rather infrequent after 40 years of age while on the other hand gall bladder infections are relatively infrequent before. It is more common in females than males and especially in those who have borne children. The attack is frequently associated with indiscretion in diet, coming on suddenly with severe paroxysmal pain in the epigastrium and right hypochondric regions. Repeated vomiting is the rule and the contents are usually richly bile stained. The abdomen is distended and rigid but the greatest point of tenderness is usually at the costal margin. The temperature rises while the pulse is comparatively slow which is an extremely important diagnostic point. A study of the literature demonstrates that perforation of the gall bladder in typhoid fever does occur and issues a warning sign to be on our guard.

Finally if our cases are studied carefully and the conditions that are likely to cause confusion kept closely in mind, few mistakes will be made, and many lives saved.

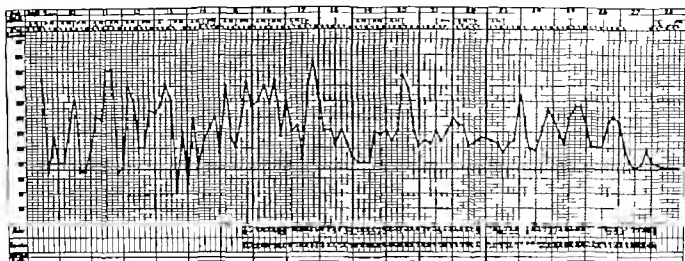
TREATMENT

There is only one method of treatment in these cases requiring discussion which was well stated by Mikulicz in 1884, when he said:

If suspicious of perforation one should not wait for an exact diagnosis and for peritonitis to reach a profound degree, but, on the contrary one should immediately proceed to an exploratory operation which in any case is free from danger. How much more true the above statement is in present day surgery is well understood. Our patient's life depends on the recognition of the perforation, and not the resulting peritonitis, and unless we are capable of doing this we are a stumbling block to the patient's welfare.

As soon as perforation is recognized or greatly suspected the patient should be given morphine immediately. Quoting Morris:

We are choosing the lesser of two evils, for the tremendous shock is more deadly than are the escaping bacteria when the patient is not quieted by opium.



Temperature chart. Case C. H. Note sudden rise of pulse and temperature on the 18th at time of perforation.

There seems to be a difference of opinion as to the choice of anaesthesia. Woolsey believes these cases take gas and ether well. In two cases reported by him cocaine was used satisfactorily for exploration but retraction of the edges and the necessary handling of the inflamed bowel were painful and this together with the realization of being subjected to an operation cause more shock than general anaesthesia.

As to choice of incision most surgeons will agree on the right rectus or McBurney's as statistics conclusively show that more than 80 per cent of the cases perforate in the lower eighteen inches of the ileum and the nearer we are to the lateral wall, the less the danger of spreading the infection over the peritoneal cavity. The perforation should be located as quickly as possible and with little handling of the bowel.

The perforation can be closed in most cases with a purse string reinforced with a row of Lambert or mattress sutures the greatest care being taken however not to constrict the lumen of the bowel which if done will almost certainly result in ileus. In all cases the ileum should be explored as far as the inflammatory process extends for multiple perforations or deep ulcers. Some cases may require resection where the perforation is large but unfortunately the quickly resulting peritonitis and extreme shock of such an extensive procedure has proved fatal in nearly all reported cases of this character.

The peritoneal cavity should be carefully sponged with saline solution but irrigation should be avoided unless a general peritonitis exists. Thorough drainage should be employed and the Fowler position obtained as soon as the patient's condition will permit.

Intravenous subcutaneous or proctoclysis should be used according to the demand of the condition of the patient. Morphine should be continued until the peritonitis becomes well localized and the bowel not disturbed in any way. Later they should be taken care of by flushing and small doses of opium. No food whatever should be given by mouth and if vomiting has been quite severe lavage should be used before the patient comes from under the anaesthetic. Stimulation should be used according to the demands of the patient and the condition of the heart muscle carefully observed.

In conjunction with this paper I wish to present the following case:

C. H. age 7 Previous history Child showed some malnutrition during first year but rapidly outgrew it. Had measles about two years ago and a few months later chicken pox and mumps, all of which were mild in character and left no sequelae otherwise has been exceptionally well.

Present illness On August 28, 1914, after returning from a ride, he complained of headache, and the next few days seemed to have a cold which did not yield to the usual home remedies. He appeared languid and drowsy. Dr. J. M. Nicholson was called to see him September 9 and after a careful examination a diagnosis of bowel infection was made. The bowel movements were rather watery.

and decidedly green in color. The patient had a variation of temperature from 98° to 101.5°. The following day the temperature varied from 98° to 103 and on the 11th 98.4 to 105° with continuation of the green movements.

No improvement was shown during the next few days and I was called in consultation the evening of the 15th. A careful examination was negative other than abdominal trouble. Much distention was present but no special tenderness, and the bowel movements were decidedly green. Until this time the child had been cared for by the mother. A nurse was put in charge of the patient and a Widal suggested if improvement did not occur immediately.

On the 6th there was little change. The 17th, at 10:30 a.m. temperature 99.5° pulse 60 respiration 28 at 3:30 p.m., temperature 101 pulse 120, respiration 28 and at 6 p.m. temperature 102.5° pulse 120 respiration 28. All movements of the day were recorded as very green and the result of normal saline flushings. 7:30 p.m. the child had a severe chill lasting 10 minutes which was followed by a very severe pain in the right side. The pulse became weak and the lips and fingers cyanotic. The grave condition of the patient was recognized immediately by the nurse and Dr. Nicholson was called. An immediate blood examination was made by Dr. Nicholson showing a leucocytosis of 33,000, and the patient was ordered to St. Joseph's Hospital. The temperature at 8:5 p.m. was 103.6° pulse 160 respiration 40 at 9:00 p.m. temperature 105° pulse 160, respiration 40 at 9:45 p.m., temperature 105.4° pulse 140 respiration 40. The patient entered the operating room at 1:30 p.m. with the typical expression of collapse and peritonitis. I was assisted by Dr. Nicholson, to whom I wish to give due credit for his alertness. A McBurney incision was made and the following conditions discovered:

1. A very severe appendicitis appendectomy
2. A perforation about 16 inches from the ileocecal valve which was rapidly closed and two other ulcers that showed clearly through the peritoneal coat were reinforced. The abdominal cavity was carefully sponged with normal saline solution and a small median incision was made for counter drainage. The patient was returned to his room at 1:30 a.m.

At 1:30 a.m. pulse 160, respiration 40. Stimulants and morphine were given. At 7:00 a.m. axilla temperature 100 pulse 140, respiration 32 at 9:00 a.m. temperature 100° pulse 120—stronger respiration 34. Digitalin 1/200 was given every 4 hours. 6:00 p.m. temperature 100 pulse 140 respiration, 8:100 m. temperature 99.6°, pulse, 90 respiration, 28—but very restless. September 9 temperature varied 99 to 101 pulse, 90 to 136 very weak. September 10, temperature varied 100 to 104.6°, pulse 128 to 52. Abdomen greatly distended with marked intestinal peristalsis.

Eserine gr 1/200 given at 9 p.m. and 3 a.m. with calomel gr 1/30 every hour. 7:00 a.m. watery bowel

movement and much gas. September 11 temperature 100 to 101 pulse 128 to 136 respiration 24 to 28. Eserine 4/10 and 4 involuntary bowel movement 1:30 p.m. and semicolid bowel movement at 8:30 p.m. Positive Widal obtained. September 12 temperature 100 to 102 pulse 108 to 128 respiration 20 to 24. Fairly good night. Eserine at 8:1 and 8 September 13 temperature 99.6 to 103.4 pulse, 100 to 135 September 14 temperature 99.8 to 103.6° pulse 104 to 128 Sept. 15 temperature 100. to 102.6° pulse 120 to 128 September 16 temperature 99.4 to 103 pulse 112 to 8 September 17 temperature 98.6 to 100° pulse 100 to 118 September 18, temperature 98 to 98.6 pulse 65—1 September 19 and 20, temperature 97 to 98.6° pulse 96 to 98 October temperature rectal 96 to 97 pulse 80 to 90, very irregular acute myocarditis present. October 3 rectal temperature 96.4 to 97.4 pulse 65 to 88 very irregular. Patient cold external heat applied. Pulse remained very irregular during the next week after which time recovery was uneventful.

In conclusion the following deductions may be drawn

1. While perforation varies greatly in different epidemics, about 1 per cent of the total death rate is due to this complication.
2. That perforation occurs in about 3 per cent of all cases treated.
3. That perforation is relatively infrequent in children.
4. Statistics show that over 80 per cent of the total perforations occur in the lower ileum.
5. That the location of perforation coincides with the study of Baer.
6. That the majority of cases perforate during the second and third week.
7. Diarrhoea is an important factor in its production.
8. Acute abdominal pain during the course of typhoid should always be taken seriously.
9. The sudden rise of blood pressure is positive evidence of perforation while an unchanged pressure is not of negative value.
10. The importance of a careful study of the blood cannot be overestimated.
11. The welfare of the patient depends on our ability to differentiate between the symptoms of perforation and those of the resulting peritonitis.
12. The treatment of perforation is surgical and the death-rate is in inverse ratio to the length of time allowed to elapse before operation.
13. Operations are indicated as soon as perforation has taken place and should be continued until the peritonitis has become well localized.

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DELIVERY BY ABDOMINAL SECTION¹

By EDWARD P. DAVIS, M.D., F.A.C.S., PHILADELPHIA

NOTHING has been more striking in the evolution of medical science than the advance which has taken place in a comparatively brief time in obstetric surgery. The establishment of cesarean section upon a basis of success comparable with that of other abdominal operations was a great advance over the uncertain and unsatisfactory and difficult deliveries by forceps or craniotomy. But recently it was found that in addition to the problem of delivering the child safely a very considerable range of pathological conditions accompanying pregnancy may be successfully dealt with at the time of delivery. The fact that it is difficult and often impossible to positively know the condition of pelvic and abdominal organs without section and that during labor serious changes may occur in intra-abdominal conditions which may result in infection or hemorrhage has made delivery by abdominal section in many instances a far more complicated procedure than simple cesarean section.

Highly contracted pelvis has been made one of the simplest complications of parturition by the success of a classic cesarean section, but pathological conditions in the pelvis and abdomen complicating pregnancy may be of several varieties.

The most serious accident in labor or in pregnancy is rupture of the uterus and whether this occurs during parturition or during pregnancy the most successful treatment is by abdominal section. Rarely is it possible to save the uterus. Hysterectomy in the great majority of cases is indicated and if it is thought wise to drain through the vagina, extirpation of the uterus may be chosen.

Foci of infection in pelvic or abdominal organs developing during pregnancy may threaten the patient's life through the bursting of an abscess and the escape of its contents into the peritoneal cavity. One of the difficulties in diagnosis in such a case is

the fact that such a focus may remain quiescent during the greater part of pregnancy and its existence only become apparent through some accident. In the experience of the writer a woman of unknown antecedents passed easily through a spontaneous labor and a puerperal period of two weeks without evident complications. During the third week while convalescent and acting as helper in a ward after lifting a bucket of coal she complained of vague indefinite abdominal pain. Influenza was epidemic at the time and many of her symptoms were those of influenza. Peritonitis rapidly developed and section undertaken too late revealed an old focus of infection in a tubal abscess which had ruptured upon exertion causing fatal infection. Could the existence of this abscess have been known at the beginning of labor and abdominal section promptly performed the patient's life might have been saved. It would have been wiser in that case to have delivered the child by section without labor and then dealt with the abscess.

A not uncommon and very great risk to the parturient woman is appendicitis. If this condition is not met promptly by operation and abscess forms the uterus will usually undergo contraction and abortion or labor develop. In either event, the contractions of the uterus will rupture the wall of the appendiceal abscess and infection will follow. The majority of obstetricians remove the diseased appendix at whatever period of pregnancy appendicitis may develop and with excellent results. Should appendiceal abscess complicate gestation and viability it would be safer to open the abdomen empty and close the uterus and then deal with the appendiceal condition.

Obstetricians have learned by experience that it is dangerous for a woman having a septic focus in pelvis or abdomen to undergo the disturbance of labor and there is no method combining prompt delivery and efficient

treatment of the septic condition present which compares with abdominal section.

The presence of pelvic or abdominal tumors complicating pregnancy is also an indication for section. Ovarian tumors during pregnancy have an especial tendency to twisting of the pedicle and the gangrenous changes in the tumor which follow this accident. Fibroid tumors which block the pelvis or seriously interfere with the contraction of the uterine muscle furnish a valid indication for section. Multiple fibroids of the uterine muscle which may produce no tumor large enough to be detected by palpation prevent the physiological development of labor and are best dealt with by delivery by section. Cancer of the cervix calls for the prompt extirpation of the uterus so soon as discovered, but if the patient be near viability and wishes to take the risk of the prolongation of pregnancy to secure a living child delay may be practiced in accordance with the patient's request.

The topic receiving most attention at present from obstetricians throughout the principal clinics in this country and abroad is the treatment of advanced pregnancy complicated by premature separation of the placenta, whether normally situated or placenta prævia. This topic was discussed at several international meetings just before the European War and in the literature of the year 1915 the number of papers upon this subject far exceeds those written upon any other topic. Obstetricians recognize fully the fact that many of these cases must be dealt with by the general practitioner in emergency. Certain well-defined procedures are available under these circumstances. But as hospital facilities are becoming more abundant in this country and means of transportation more efficient, more of these cases will receive hospital care. Under these circumstances, there can be no question but that premature separation of the normally implanted placenta is dealt with most promptly and safely by section.

Obstetric opinion may be divided as to the choice between vaginal and abdominal section, but the writer's preference is decidedly for the latter. There is a much wider dif-

ference of opinion concerning the treatment of placenta prævia by abdominal section. Many obstetricians limit the operation to those cases where the cervix is undilated and not readily dilatable and where mother and child are in good condition, the child's heart sounds being sufficiently strong to indicate that it has not suffered greatly from the loss of maternal blood.

In the mind of the writer placenta prævia is analogous with ectopic gestation. By ectopic gestation as commonly understood, we mean the attachment of the ovum outside the cavity of the uterus, and the common acceptance of this term limits this attachment to the wall of the uterus and the contents of the pelvis or abdomen. Under these circumstances, the danger of infection aside from that which accompanies an operation is very little and arises from the proximity of the ectopic gestation to the intestine and its contents of feces and bacteria. The great risk of ectopic gestation is ordinarily hemorrhage.

When placenta prævia is considered the ovum at all stages of pregnancy is attached very near the vagina, which invariably contains bacteria. Dilatation of the cervix to some slight extent is inevitable and this is at once accompanied by the danger of infection. This danger is now appreciated and the majority of obstetricians have abandoned in placenta prævia tamponing the vagina or other forms of treatment through the vagina, except such as have for their object the emptying of the uterus by the removal of its contents. In placenta prævia the lower portion of the uterus is unusually rich in blood and the separation of the placenta opens many channels for infection. Post partum hemorrhage is a frequent accompaniment of vaginal delivery in placenta prævia.

Under these circumstances, in cases where the greater portion of the cervix is covered by placenta and the membranes are not readily available for rupture, it is the writer's belief that delivery by abdominal section is indicated.

Modern surgery has reiterated anew the doctrine of the importance of shock. In all

departments of surgery the effort is constantly made to improve anæsthesia and to block those channels by which dangerous reflexes may be conveyed to vital centers. Obstetricians recognize the fact that there are patients in whom the physiological phenomena of spontaneous parturition cannot be successfully carried out and in whom the occurrence of uterine contraction and dilatation end in failure to deliver the child and in dangerous depression. The phrase physiological incompetence for labor has been proposed by some who have written upon this subject. Under these conditions anæsthesia and delivery by abdominal section at a most favorable time and under the most favorable circumstances give better results than a painful and tedious labor followed by difficult vaginal delivery and its inevitable traumatism.

The present world crisis has considerably increased the value of human life through the enormous waste which war has occasioned. Hence the preservation of infant life is at present a topic of widespread interest. While the ancient rule holds that the mother's interests should first be considered, cases arise in which the mother's interests are not unduly jeopardized if the birth of the child be secured by abdominal delivery. Patients who have lost children in previous labors through disproportion or physiological incompetence although the pelvis may be of average size may rightfully elect delivery by section in the interest of the child. Were the mother only to be considered craniotomy might be employed in the failure of spontaneous labor.

Very rarely conditions arise where prompt delivery under anæsthesia is indicated in the interests of mother and child because some condition of visceral disease threatens the lives of both. In the writer's experience delivery by abdominal section in eclampsia is very rarely indicated and yet occasionally, where the mother has apparently been in good condition before the first convulsion and where the child's heart beats are strong and regular and no sign of labor develops, immediate delivery by section may be admitted. In cases of serious disease of the heart where the child is abundantly viable and compensa-

tion is failing it may be possible to save the life of the child and prolong that of the mother by delivery by section without labor.

Under what conditions shall delivery by abdominal section be terminated with the sterilization of the mother? A plain indication arises where there is abundant evidence that the uterus is the site of an active septic infection at the time of labor. In these cases a cardinal rule of operation calls for the removal of the fallopian tubes and body of the uterus and the leaving of the uterine stump outside the peritoneal cavity or if the operator prefers the extirpation of the entire uterus. The removal of the ovaries or their preservation must depend upon the age of the patient and the condition of the pelvic tissues at the time of operation.

Shall the obstetrician act as judge in those unfortunate women who are habitually immoral, diseased and mentally, physically and morally degenerate. And shall the procreative power of such be terminated by operation? In these cases the cardinal rule of the profession is to save life without regard to the moral character of the individual, but in those women who are imbecile, epileptic, insane or degenerate the permission of parent or guardian should be obtained for sterilization. If such is not available consultation should certainly determine the propriety of the step.

Have husband and wife the right to decide that sterilization be performed?

This question may be a difficult one to decide but in the experience of the writer such a request will rarely be made of the obstetrician unless there is the history of previous unsuccessful and dangerous parturition. Such is the success of repeated section that this choice should not be hastily made and if the parents are sound and there is every reason to believe that the offspring are healthy the claims of repeated section must be urged. But if the parents decline to take the risk of repeated section and request sterilization it is a question whether the obstetrician has a right to refuse such a request.

The Roman law which called for immediate section upon the body of a woman pregnant near term and dying suddenly to save the

child still holds, and in the writer's observation three cases have arisen where this procedure was clearly indicated. Caution must be observed not to promise the ultimate survival of the child for in some of these cases the disease which ends the mother's life may render impossible the continued life and growth of the infant. In abdominal or other ectopic pregnancy section is clearly indicated.

By whom shall delivery by abdominal section be performed?

The best results will be obtained when these operations are done in well-equipped maternity hospitals and by obstetricians. Neither the general surgeon nor the gynecologist has sufficient experience in pregnancy and parturition to make him a wise judge in deciding the important questions which these cases present. These patients call for far more than merely technical skill. A thorough knowledge of the pathology of pregnancy and labor not only in the mother but in the fetus, is necessary for an intelligent choice of the variety of operation and the time at which it should be performed. Improvement in obstetric teaching and the development of maternity hospitals are gradually producing competent obstetricians, and such should deal with these cases.

It may not be without interest to allude briefly to the writer's experience. These cases came from an obstetric service in a large city and were operated upon in a small maternity hospital where the facilities of operation while practically adequate, were not those of a luxuriously appointed surgical amphitheatre. These cases cover a period during which obstetric surgery was developing in this country and therefore represent what may fairly be taken as an average.

The indications for operation embraced the field of obstetric pathology outlined in the preceding paragraphs.

The operations consisted of 129 classic cesarean sections 50 hysterectomies 10 which the stump was dropped and the abdomen closed without drainage 32 Porro operations in which the stump was fastened by a clamp

in the lower end of the abdominal incision 3 extirpations of the uterus, and 2 sections performed at the moment of maternal death—a total of 216 operations. These cases may again be divided into those that were in fair condition at the time of delivery with no fatal disease of the viscera and apparently uninfected by sepsis, and those which were at the time of delivery infected or suffering from some fatal disease affecting the important viscera. Of the former cases in good condition, there were 151 with one maternal death—a maternal mortality rate of 0.066. Of those cases that were infected and in bad condition there were 65 with 16 deaths—a mortality rate of 26 plus per cent. the mortality of the entire series being 8 per cent.

The one case of death in those in good condition occurred from peritonitis caused by the bacillus proteus vulgaris. Bacteriological examination of suture maternal dressings, and instruments failed to disclose the source of infection.

With the other fatal cases the toxemia of pregnancy in its various phases was the cause of death in by far the greater number of cases. Degenerative conditions of the heart muscle kidney and liver were the principal visceral lesions in these cases. Among those dying of infection the number was relatively but a small proportion of the whole and of these infections pulmonary infection by the pneumococcus or the mixed infection of catarrhal pneumonia and acute pulmonary tubercular infection were the principal causes of death.

These patients were many of them brought by ambulance from tenements and were in various stages of exhaustion and infection. In many of them there was no time for adequate preparation. As regards the fetus there was no foetal mortality in any case in which the fetus was in good condition at the time of operation and those foetal deaths which occurred were the result of previous attempts at delivery or infection or malformation. Of especial interest to the writer are twenty four cases of placenta prævia without a maternal death.

DIAPHRAGMATIC HERNIA

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IF we carefully review the literature on diaphragmatic hernia we will readily find that this condition is not nearly so rare as has heretofore been considered. A diaphragmatic hernia has always been regarded as a surgical curiosity, perhaps chiefly because the condition has rarely been diagnosed prior to operation or post mortem examination. In a review of some 250 cases by Leichtenstein (1) in 1897 in only 5 cases was the diagnosis made before death.

If we consider the anatomical development of the diaphragm and the relation it bears to the abdomen and the viscera it will seem almost obvious that hernia of this type should be just as common as other abdominal hernia. The diagnosis has heretofore been difficult because of the lack of external manifestations and definite physical signs. It has frequently been found while operating for some entirely different cause but most often at necropsy where death may have been due to other causes or directly to the hernia (i.e. strangulation or incarceration of the stomach or gut or to intrathoracic pressure).

Diaphragmatic hernia may be divided into three distinct types.

True hernia Those having a distinct sac. These may be either congenital or traumatic.

False hernia Those without a sac. Most of these are traumatic.

Elevation This is not a hernia in the strict sense of the term but a doming or thinning out or the entire absence of a part of the diaphragm.

In view of the pathology of this condition certain signs in the examination of the chest, such as displacement of the organs of the chest, dullness on percussion gurgling etc. should be of value in making a diagnosis especially in conjunction with the subjective symptoms. However these signs have on some occasions only confused and have led to other diagnoses such as pleuritic effusion. O'Dwyer (2) of New York in 1890 reported a case of this kind finding a diaphragmatic

hernia of the small bowel while operating supposedly for a pleuritic effusion in a child 1½ years old. The following day he operated for the cure of the hernia but the child died soon after the operation. In recent years however the X-ray has been the means of diagnosing the condition prior to operation or autopsy and through it diaphragmatic hernia will in the future I believe become more and more a definite surgical condition rather than remain a surgical curiosity. A brief review of the literature of some of the more interesting cases or series of cases will I believe not be amiss.

As early as 1852 Mr. Lawrence (3) reported to the London Pathological Society a case of large eventration found at autopsy on a man who had died of pneumonia. In 1861 Hulier (4) reported to the same society a case of diaphragmatic hernia of the small intestine found at autopsy in a child 1½ years old that had died apparently from intrathoracic pressure. In the *Bulletin of the Anatomical Society of Paris* (5) for the year 1863 is found a report of a case in which autopsy showed that death had been due to strangulation of a diaphragmatic hernia of the large bowel. In 1907 Gordon (6) of British Columbia operated on a man 33 years old for what he thought was a pyloric stenosis and found the entire stomach in the chest-cavity. A gastrojejunostomy was done after replacing the stomach in the abdomen; death, however, followed three days later. No attempt was made to close the enlarged diaphragmatic opening. In 1897 Cordier (7) of Kansas City did an emergency operation for an acute bowel obstruction but was not able to locate the obstruction until after death at which time he found the entire stomach and large bowel strangulated in the chest-cavity through an opening in the diaphragm 3 inches in diameter. Death was caused by the strangulation. In 1914 Binnie (8) stated that there were only two cases of cures on record.

In 1915 Robert Klenboeck (9) presented a rather extensive classified review of the German literature, which in brief is as follows:

A. Cases where autopsy showed death to have been due to strangulation of bowel or stomach through diaphragm. There were 11 left-sided false hernias, 2 left-sided true hernias, 1 left-sided rupture of the diaphragm.

B. Cases where autopsy showed death to be due to strangulation of stomach with perforation into (a) the thorax—3 left-sided false hernias, (b) the abdomen—1 left-sided true hernia and 1 enlarged oesophageal opening with split in diaphragm.

C. Cases simulating gastric ulcer or pyloric stenosis. Death due to other causes. Eight false hernias and 2 true hernias.

D. Cases diagnosed *intra vitam* and confirmed at autopsy. One eversion, 3 hernias.

E. One case coming to operation with large opening in the diaphragm. Stomach partially in the chest-cavity. Reposition of stomach and closure of diaphragmatic opening resulting in clinical cure.

Perhaps the most recent report of a cure of this interesting condition is that of Balfour (10) in January 1916 of a case from the Mayo Clinic, Rochester, Minnesota. A tentative diagnosis of hernia had been made prior to the X-ray examination and later confirmed by the X-ray and this in turn at operation, at which time a radical cure was effected. This case was apparently of traumatic origin, trauma having taken place 4 years previously. There was a large tear in the left half of the diaphragm allowing the protrusion of both stomach and bowel into the chest-cavity, causing the displacement of heart and lungs, giving rise to rather definite signs on chest examination.

The cases cited are perhaps only a small percentage of those already reported. However in a review even more extensive than the foregoing two facts remain prominent, namely the extremely small number of cases recognized prior to autopsy and the still smaller number of cures effected. Diaphragmatic hernia will no longer remain a surgical curiosity as heretofore but with the

X-ray at hand will become an almost every day finding. For this reason the diaphragm will in the future become a more frequented field for the surgeon. Each case bears with it different points of interest and is therefore worthy of record. The history of a case, which I had occasion to operate upon early in December 1915 was of especial interest from various points of view and is in brief as follows:

Mrs. D. age 68. Family history negative. Previous personal history. Although she has had more or less stomach trouble all her life even in her early childhood she has never had any real severe illness and has enjoyed comparatively good health. She has had four children and the confinement with each of these was a long protracted one, the labor in each case lasting from 36 to 7 hours. From the first of these she dates her present trouble. This was about 36 years ago. From then on she began to have pain after eating with much discomfort, belching and sour stomach. She often vomited her entire meal, undigested, four or five hours after ingestion. In the last two years this train of symptoms has become exaggerated in every respect. The pain and distress after eating became more severe, seldom was she free from sour stomach or belching. Vomiting followed almost every meal and the vomitus was often of a brown color. In the last year the pain and discomfort after eating became so severe and the vomiting so regular that she became afraid to eat, although she always had a good appetite. She has lost approximately 35 pounds in weight in the last ten months.

On December 1 I advised her to come to the city for stomach analysis and X-ray examination. The physical examination at this time showed little except signs of great loss of weight. Although still a large woman the skin was loose and flabby. The heart and lungs were normal to auscultation and percussion. There was no displacement. Clinical diagnosis at this time was pyloric obstruction, in all probability due to a cancer. On December 1, having been prepared for a barium meal, she was sent to Dr. Charles Goodman for X-ray examination. This proved to be most interesting. Repeated attempts to get a shadow of the barium in the normal region of the stomach failed. However shadows of the barium in what appeared to be the duodenum were shown, but these were rather far to the left. At last a large plate showed a large blotch of the barium in its extreme upper portion and on close examination it was found to be above the shadow of the diaphragm. This gave Dr. Goodman the idea that her trouble might be in the oesophagus and not in the stomach. Pictures through the chest were then taken. All of these showed what appeared to be the outline of the stomach above the

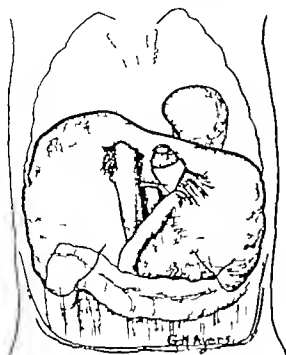


Fig. 1. Showing the entire stomach in the posterior thoracic cavity behind the heart and dense fibrous band binding the pylorus and first portion of the duodenum to the margin of the enlarged esophageal opening.

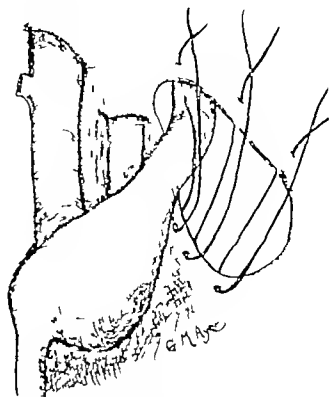


Fig. 2. Stomach pulled through the hernia ring and attached to the abdominal wall by sutures.

diaphragm behind the heart with the greater curvature upward and the pylorus to the left. Another examination two days later showed the same results. The stomach analysis proved to be normal in every respect except for a faint trace of blood. This I think was due to the stomach tube which passed with difficulty after reaching a certain point.

On December 6 the abdomen was opened one inch to the left of the median line directly below the margin of the ribs and our X-ray diagnosis was readily confirmed. The duodenum was seen passing to the left and upward directly to an opening in the diaphragm large enough to admit the entire hand. The opening was to the left and posterior and proved to be the esophageal opening. The entire stomach was found in the posterior mediastinum directly behind the heart. An attempt was made to deliver the organ through the opening into the abdominal cavity but this could not be done. It was found that dense fibrous bands of adhesions were holding the pylorus directly to the margin of the ring. These bands were so dense and firm that they had to be cut. After this was done the stomach could readily be pulled through into the abdomen. Interrupted sutures of heavy chromic catgut were then passed through the margins of the ring so as to almost entirely close it. This was accomplished with great difficulty because of the depth and angle of the field and also because the movements of the diaphragm caused the liver constantly to slide over the ring but chiefly because of the

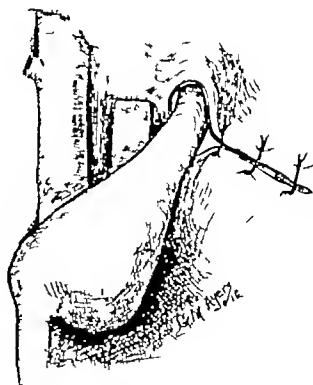


Fig. 3. Stomach herniated almost entirely through the diaphragm.



Fig. 4. Roentgenogram, teroposterior view (not touched). The stomach is to the left of the spine and appears to form a loop before the pylorus is reached. Just external to the pylorus is the shadow of the heart.

proximity of the aorta on the one side and the pericardium on the other. Before closing the abdomen I fixed the stomach to the abdominal wall with two chromic gut sutures. The patient has made rather uneventful recovery and since the fourth day after the operation has enjoyed three big meals each day. The X-ray examination since the operation shows the entire stomach below the diaphragm but still somewhat higher than is normal. This I believe is due to an excessive doming of the diaphragm since the operation, the withdrawal of the stomach from the chest cavity leaving scant space above it.

This case is rather unique in that although the entire stomach was within the thorax there was no displacement of the heart in any direction nor was there any respiratory embarrassment as possible result of pressure. It was apparently congenital hernia, although the difficult labor in each case on this point must not be overlooked as possible etiological factor.

In the surgical treatment of these conditions the route of operative procedure is of course a subject of great importance. The two cases found on record by Binnie as cured, were by the thoracic route. Hedenhede's case in Kienboeck's review as well as Balfour's case was by the abdominal route. There are certain factors in the thoracic route which make it more hazardous and a more difficult operation. It is a much more extensive operation requiring in many cases the resection of 3 or more ribs and in most cases intratracheal anesthesia. It is therefore a greater



Fig. 5. Roentgenogram oblique view. The stomach is above the diaphragm, the pylorus directed backward and down and just anterior to the spine.

shock to the patient. In the abdominal route the liver greatly obstructs the field but with suitable retractors this can be overcome. If the abdominal route is chosen I believe a sort of reverse Trendelenburg position (i.e. head high and pelvis low) will be of advantage in making the field more accessible. Whatever route is chosen the field is at best a difficult one because of the proximity of the vital structures and any new point in the technique or new method of procedure will be valuable.

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CARCINOMATOUS DEGENERATION OF SEBACEOUS CYSTS

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ALTHOUGH Stedwagon (1) and Ziegler (2) state that sebaceous cyst rarely undergo epitheliomatous degeneration Rucker and Schwalb (3) in a monograph on tumors of the skin reviewing the whole literature to date report on 43 cases of epitheliomatous degeneration of sebaceous cysts. The patient comprised 31 males and 12 females but mention of the sex of the remainder was not made. Rucker and Schwalb found that heredity played an unimportant role. None of the cases was congenital. They could ascertain no one exciting cause in one case trauma was mentioned as a predisposing cause while in another menopause.

The ages of the patients varied one patient was less than 20, 10 cases were 60 or more and 29 were in the fourth to the sixth decade.

The tumors usually grew slowly. Most of them were the size of a walnut some attained the size of a man's fist.

The predominant location of these tumors was the face. The tumors were located as follows: 8 had their origin in the meibomian glands of the lids, 6 were situated on the cheek, 7 originated from the skin of the nose, 3 from the skin of the forehead and upper lid, 7 from the back part of the scalp, 1 was situated in the skin at the inner angle of the eye, 1 from the skin of the back, 1 in the breast, 2 in the abdominal wall and 1 in the upper extremity.

There is no mention of spontaneous appearance of any tumor.

In 17 cases out of 41 ulceration apparently played an important part in the transition to epitheliomatous degeneration.

Bloodgood (4) in twenty years observed about 300 cases of cancer in accessible regions of the body such as the skin, subcutaneous tissue and mucous membranes of the mouth, tongue and lips. The author feels that

proper surgery in the precancerous stage can accomplish 100 per cent cure.

In order to understand the pathologic picture and clinical course of these growths a study of the embryology and histology of the sebaceous gland is necessary.

Histologically sebaceous gland or hair follicle gland and sebaceous gland are in close relation to the hair follicles in the corium (1). They consist of a secretory portion and a duct. The basement membrane of the gland is surrounded by dense connective tissue arising from the hair follicle or from the corium and contain the blood vessels, nerves and lymphatics. Upon the basement membrane are several layers of epithelial cells, the outermost resembling that of the rete malpighii. In this layer the cells are cylindrical and columnar toward the inner portion they become larger and more or less cuboidal or polyhedral in shape.

According to McCarthy (5) these glands originate from the stratum germinativum or germinating layer of the epidermis. Downward growth of these cells into the subcutaneous tissue is accompanied by differentiation into hair, sebaceous glands, etc. Each newly differentiated part retains a row of cells which corresponds to the embryonal stratum germinativum.

Pathologically the ordinary sebaceous cyst is a retention cyst and arises from the occlusion of the orifice of a sebaceous gland on the surface of the skin. There being no outlet the secretion of the gland continues to collect in the interior and forms a cystic tumor. These are usually located on the face and scalp but may occur on any part of the body.

In following the development of a sebaceous gland and the formation of a sebaceous cyst one can readily conceive by proliferation of the epithelial cells lining the cyst which correspond to the embryonal stratum ger-



Fig. Specimen No. 357 subcutaneous epithelioma with keratohyaline degeneration. A Overlying skin B normal sebaceous glands. C tumor



Fig. Specimen No. 447 subcutaneous epithelioma basocellulare. This specimen shows the epithelial cell thin sheoli arranged in pseudopapillary form

minativum it may undergo epitheliomatous degeneration. This proliferation may be due to irritation from within (as in Case 2) or as the result of ulceration of the cyst (Cases 1 and 3).

Within a period of twelve months we have had two very striking examples of the great value of early and complete removal of sebaceous cysts of the scalp that had undergone malignant degeneration. A third case seen by one of us (Seff) which terminated in general carcinomatous and death of the patient showed the result of incomplete removal of the tumor.

CASE. J. S. male, age 5 years, admitted to the Beth Israel Hospital, November 7, 1909, with the following history: At the age of 2 he noticed small growth on the right side of the head which did not increase in size till he was 35 years of age after which it rapidly enlarged. The growth became inflamed by continual irritation from combing his hair and finally opened with the discharge of serosanguineous fluid and foul smelling cheesy

material. The tumor was removed and he was told that it was sebaceous cyst. Within six years he had three recurrences of the tumor at the site of the first operation, and was told each time that the growth was a sebaceous cyst. His history on admission was as follows:

Nine months after the third removal of the growth i. e. fifteen months before the patient came under our observation he noticed small growth in the same location, which gradually became larger and ulcerated. On examination there is a growth about the size of buttonnut with crater-like ulcerated appearance situated over the right parietal eminence. The edges are indurated and the characteristic sebaceous material extrudes from its surface. The anterior and posterior cervical glands are not palpable. A diagnosis was made of epitheliomatous degeneration of a sebaceous cyst. Under general anesthesia the tumor with the healthy skin and subcutaneous tissue for distance of about a quarter of an inch beyond the growth was excised. The edges of the wound were brought together and the wound healed by primary union.

Pathological report by Dr. E. Moschowitz—specimen 357 (Fig. 1)

Four sections were taken from the tumor proper



Fig. 3 Specimen No. 50-6 recurrence of subcutaneous epithelioma basocellulare. This specimen shows the same arrangement as specimen No. 4427.

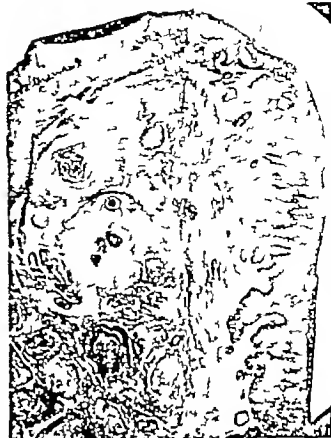


Fig. 4 Specimen No. 451 epithelioma. A detailed description of this specimen is given in the text (Case 3).

the tumor with overlying skin from the ulcerated edge of the tumor and from the subcutaneous tissue beyond the margin of the growth.

The tumor is a subcutaneous epithelioma consisting of smaller and larger alveoli irregularly polygonal in shape with only a small amount of stroma intervening. The alveoli are filled with epithelium which is basilar at the periphery becoming more flattened and larger as we proceed to the central portion. The central portion of the alveolus is occupied by a necrotic finely granular material, shading gradually into the adjacent epithelium. Within this necrotic material are shadows of epithelial cells some of which show faintly staining nuclei. These necrotic areas stain profusely with eosin. In some of these areas may be seen cross sections of the hair.

The epithelium is irregular but regularly placed. There are numerous mitoses and an appreciable number of epithelial pearls. In that portion of the growth situated beneath the cutis there is a distinct zone of connective tissue intervening between the growth and the superficial epithelium. This is infiltrated with abundant round cells.

Diagnosis: Subcutaneous epithelioma with keratohyalin degeneration.

One year after operation the patient returned with

a recurrence situated just beyond the margins of the healed incision. The posterior cervical glands were enlarged. The patient was impressed with the grave danger of allowing the growth to remain in the presence of the enlarged glands but would not submit to another operation. The patient has since succumbed to general carcinomatosis.

From an analysis of this case it is evident that malignancy is apt to occur in a simple sebaceous cyst as a result of inflammation and continual irritation. Although the growth recurred four times the lymphatic glands did not become palpable until the last recurrence.

CASE 2. Patient M. M. female, age 23 years, came under our observation at the Beth Israel Hospital Dispensary, November 2, 1913. Six months previously (May, 1913) she noticed a small irregular growth on the forehead which was slowly getting larger. This tumor was not painful or tender to touch but annoyed her from a cosmetic standpoint. Her personal and family history had no bearing on the present condition. Examination revealed a small irregular swelling situated on the

glabella about the size of an almond which was attached to the skin at one point. The tumor was movable over the underlying tissues. It was somewhat irregular in outline but felt smooth. No submaxillary glands were palpable. A pre-operative diagnosis was made of simple sebaceous cyst. Under local anesthesia (novocaine 5 per cent) the tumor was easily shelled out (the wound closed and the patient advised to return periodically for observation. The tumor on cross section showed a granular mulberry like tissue enclosing sebaceous material in the center.

Pathologic report by Dr. Eli Mouchon—specimen 4427 (Fig. 2).

The specimen represented a isolated tumor. The alveoli vary markedly in size and are irregular in shape and distribution. The microscopic field is apparently evenly divided between alveoli filled with well-staining epithelial cells and alveoli containing a small number of peripheral epithelial cells enclosing masses of necrotic hyaline tissue.

Alveoli containing cells only. These alveoli are small. The epithelial cells within these alveoli are two small and arranged in a pseudopapillary form. The nuclei are spherical, uniform in size and rich in chromatin. There is a well-developed arrangement of prickles.

Alveoli with cells containing hyaline necrotic material. These alveoli are as a rule much larger. Along the periphery are epithelial cells of greater or lesser thickness. These cells are spherical at the base, gradually taking a tetrahedral arrangement as we proceed toward the center until they merge gradually into the necrotic hyaline tissue. Within the hyaline necrotic tissue, especially at the periphery, are shadows of epithelial cells often containing nuclei which are more or less faintly stained. The necrotic tissue is arranged in cords, representing the early epithelial arrangement before degeneration takes place.

The connective tissue stroma is small in amount and reveals slight infiltration with round cells.

Diagnosis: Sebaceous epithelioma, basal illu-

The patient, although advised to report at stated intervals, did not return till seven months after the tumor had been removed. The tumor then a recurrence of the primary skin which was about the size of a hazelnut. As a result of the persistence with Case 2, we decided to make more extensive removal of the surrounding tissue. Under local anesthesia the growth was removed with the adjacent skin and subcutaneous tissue for a distance of a half inch. The subcutaneous tissue for a very short distance beyond the growth also had the same peculiar mulberry like appearance as was seen in section of the tumor.

The microscopic examination of specimen 56 the recurrence was reported by Dr. Mouchon as being identical; appearance with the original growth (Fig. 3).

The patient has been entirely free from any

recurrence since the last excision of the tumor and the surrounding tissue and is in good health almost two years after the second operation.

Case 3: A. M. E. male, age 47 years, was admitted to the Beth Israel Hospital August 20, 1914. In May 1914 he complained of a small growth about the size of a hazelnut located in the right temporal region. Repeated manipulation by his barber caused an inflammatory reaction and the growth began to discharge a thick cheesy and foul smelling material. Two unsuccessful attempts were made by his family physician to remove the growth under local anesthesia. It continued to discharge and grow larger. The patient was told that the growth was a sebaceous cyst. On examination we found a grayish white, lamellated, pushed out ulcer about the size of a five cent piece, with inflamed edges and a surrounding flaky discharge. There were no pre-auricular nor cervical glands.

On August 13 the growth was excised together with the skin and adjacent subcutaneous tissue for a little over an inch beyond the distal edge of the ulcer. The wound healed by second intent. Recurrence was prevented.

Pathologic report by Dr. Mouchon—specimen 536 (Fig. 4).

Specimen consists of many irregular alveoli filled with squamous epithelium, many of them intercommunicating. The center of many of these alveoli contains epithelial peripheral prickles which are common. The stroma is small in quantity and consists of loose fibrous tissue infiltrated with many round cells. The circumference of the tumor is surrounded by squamous epithelium covered by a horny layer. Toward one side of the specimen this layer represents a perfectly normal skin. Around the rest of the circumference this layer shows great hypertrophy and dips into the stroma communicating with many of the epithelioma. In all of this there is evidence of ulceration.

Diagnosis: Epithelioma.

Fifteen months after operation the patient writes that there is no evidence of any recurrence or enlargement of the neck.

From the history we infer the former existence of a sebaceous cyst although at the time the patient came under our observation an epithelioma was really diagnosed.

CONCLUSIONS

1. The origin of malignant changes in simple sebaceous cysts can readily be traced by a study of the embryology of the sebaceous glands.

2. Malignant degeneration of sebaceous cysts may occur at any period of life.

3. Local irritation is an important exciting factor in the malignant degeneration of a simple sebaceous cyst.

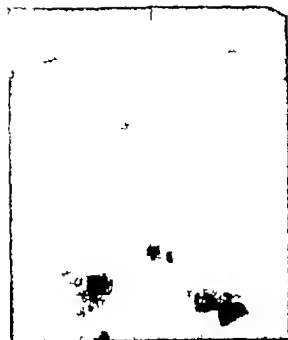


Fig. 1. Root cyst involving the left maxillary sinus.

serted through the oral incision. The gauze which extends some two inches past the protective covering may be moistened with hydrogen peroxide and lubricated with sterile vaseline. It is lightly packed against the walls of the cavity maintaining in place any mucous membrane flaps which may have been preserved. The oral incision is closed with interrupted fine catgut sutures. The drain should be removed from the nose in 24 to 48 hours. This may be followed by slight bleeding. A few post-operative nasal irrigations may be advisable.

This method of closure has been most successful the incisions healing *per primum*. In none of the cases of maxillary sinusitis did the wound re-open as is reported by Dean, who for this reason has substituted silk worm gut sutures tied over rubber tubing. The excellent union is no doubt due to the fact that the incision is made at the reflection of the mucous membrane, which is at a considerably higher level than that described in textbooks. At this level the submucous tissue is greater in amount and therefore more easily approximated. In one instance

following the removal of an extensive odontoma the anterior end of the oral incision reopened communicating with the floor of the nose (Case 3). Attempt will be made to close this at a later date.

CASE REPORTS

CASE 1. R. V. female, age 26, complained of a swelling of one year duration beneath the left eye. The enlargement had been gradual and unaccompanied by pain. There was a history of chronic nasal discharge and the nasal examination was negative. In addition to the tumor which was firm and crepitant and situated above the cuspid, bicuspid and first molar teeth on the upper left side examination of the mouth showed the absence of the upper left first bicuspid. The patient did not know whether it had erupted and had been extracted or not. The roentgenogram (Fig. 1) did not reveal the missing tooth nor was it found at operation the tooth being root-cyst. It was removed as described later technique. The post-operative course was short requiring practically no treatment.

CASE 2. E. C. male, age 3, had a dentigerous cyst operated upon three years previously and the cavity had been kept open externally and irrigated for 4 years before it closed. One month before presenting himself there had been acute pain, swelling and rupture followed by a discharging sinus in the left cheek. There was some nasal discharge. Roentgenogram (Fig. 2) showed a tumor and infection of the maxillary sinus. Operation disclosed large odontoma involving a considerable portion of the alveus. The tumor and the diseased mucous membrane of the maxillary sinus were removed. Intranasal drainage established in the usual manner and the oral incision closed with catgut. The sinus in the cheek with a portion of the scar of the previous operation, was excised and closed with fine silk. The post-operative course was uncomplicated.

CASE 3. M. B. age 3, complained of lump in her right cheek of 4 months duration and of somewhat rapid growth. This had appeared during the latter part of pregnancy which accounted for her delay in presenting herself for treatment. The growth had been slightly tender but was not accompanied by pain. Examination showed large fluctuant swelling in the right superior maxilla, measuring about 5.5 cm. and extending from the right second molar to the left central region. There were many carious roots present and the right central incisor was missing. The floor of the nose and the inferior turbinate were displaced upward and medially and there was a small perforation of the septum. The roentgenogram (Fig. 3) showed a mass in the right maxillary region and the unerupted incisor. The Wassermann reaction was negative. At operation the cyst was found to extend to the posterior limits of the maxillary sinus.

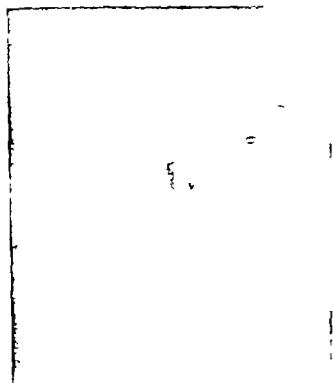


FIG. 1. Recurrent follicular odontoma of the left maxillary incisor.

destroying a large portion of its anterior and lateral bony walls. Anteriorly it extended beneath the floor of the nose and vomer to the left side. The imperfectly developed incisor was located high up beneath the vomer and removed the cyst wall was dissected free with considerable difficulty and removed. A large cavity remained which was drained by removing the part of the interior nasal wall and opening into the floor of the nose. The oral incision was closed with catgut. On a unit of the extent of the cavity packing was continued for several weeks along with irrigation of potassium permanganate solution and salt solution. Three months later the deformity had practically disappeared there was no discomfort or discharge and the maxillary sinus was clear on roentgen illumination.

CONCLUSIONS

1. Odontomata of the upper maxilla which involve the maxillary sinus to any ex-

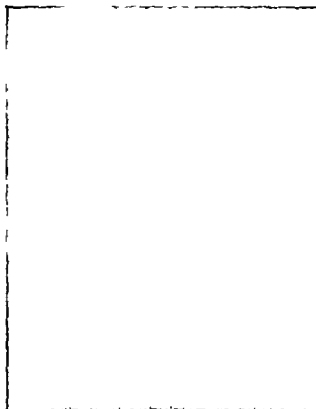


FIG. 2. Extent of the maxillary sinus and palate and the right central incisor which had been removed. The left central and right lateral incisors are visible.

tent are best treated by nasal drainage the oral incision being completely closed following the removal of the cyst wall.

2. By this procedure the post-operative course is greatly shortened the discomfort, pain and dread of the repeated oral drainage are avoided.

3. Any ill effect upon the nasal mucosa are negligible the swelling and irritation following the treatment being of short duration.

REFERENCE

Dea. An. Otol. Rhin. & Laryngol.

DEPARTMENT OF TECHNIQUE

AN OPERATION FOR THE CORRECTION OF DEFORMITY FOLLOWING CHOPART'S AMPUTATION OF THE FOOT¹

B. JOSEPH F. SMITH, M.D., W. M. A. W.

CHOPART'S amputation of the foot is open to the well known objection that it removes the front of the foot in such a manner that the weight bearing bone—the astragalus—is deprived of the support normally afforded it by the front of the foot and tends to be pushed forward against the cicatrix, producing painful tension and pressure. Besides, the tendo Achilles unbalanced by the action of the dorsi flexors, raises the heel, thus rotating the astragalus forward and tending to protrude the latter bone still more against the cicatrix. The elevation of the heel by the unopposed action of the tendo Achilles may even produce such marked back

ward tilting of the stump that the cicatrix becomes part of the weight bearing surface, thus adding still more discomfort in any attempt to walk or bear weight upon the stump. Division of the tendo Achilles gives only temporary relief and the procedure of implanting the dorsi flexor tendons into the plantar flap does not always suffice to overcome the difficulty because in this implantation it is difficult to secure the necessary leverage to give the tendons action.

In spite of the objections to Chopart's amputation, it is still described in all the textbooks and is apparently the operation employed rather frequently in railway surgery.



Fig. 1. Ray print showing position of bones of stump after Chopart amputation. Fig. 2. Approximate line of incision through astragalus and on calcus for correction of deformity.

Read before the Chicago Surgical Society, April

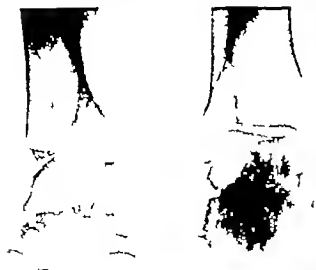


Fig. 1. A print from a postoperative film of the tumor after resection.

Following Chopart amputation Pirogoff operation has frequently been done for the correction of the deformed and painful stump. The procedure herein described was carried out as a substitute for the Pirogoff operation in the correction of this condition and has not been found in the literature at hand although it may have been previously described and carried out.

A. V. all said employment of the wrist are in the spring of 95. A hunt of the wrist described above resulting from a Chopart amputation carried out for crushing injury of the foot (wound in a blow) some about a year before. There was marked back and tilting of the stump rotating the tenor surface downward so that the scaphoid formed part of the weight bearing surface of the foot. The scar had become red and tender and the man had been obliged to discard an artificial foot which he had been wearing. The X-ray plate showed marked forward tilting of the scaphoid and tilting of the os calcis. It was impossible to ascertain whether or not any attempt had been made to anchor the dislocated os calcis.

Instead of making Pirogoff amputation the following procedure was carried out. A preliminary subcutaneous incision along the tendo Achilles was done and the os calcis was freed from the os alibi. An incision on the lateral aspect of the stump parallel with and about 1 inch above the sole of the foot was then made, the motion being carried down to the bone. After the flap had been reflected the scaphoid and the talus were sawed through along the lines A-B-F-G, the upper part on the os calcis and the lower portion of the head of the scaphoid being freed and removed. The os alibi then pushed forward under the scaphoid so that the scaphoid surface were approximated. The bones were drilled and the bones secured in position with small bone nails. The wound was closed with sutures. A light plaster cast with the patient in a prone position was applied. During the first week the cast



Fig. 2. The same patient after Pirogoff amputation.

remained in the position of slight inversion and pronation.

At the third month the patient walked without a shoe, that is, that the patient had a good shoe made which enabled him to walk without the support of any device, not that he had been in the position of the foot for the first two months, but that the patient had recovered from the deformity. The X-ray plate of the foot after the operation showed about 4 months after operation and the patient was able to walk without the aid of the stump.

The advantages of this procedure over the Pirogoff amputation are the following:

1. It is much simpler and more easily executed.
2. It preserves a larger area of the sole of the foot as a weight bearing surface—a matter of great importance in these cases.
3. It preserves the ankle joint and allows some degree of mobility to the stump.

DISCUSSION

Dr. Samuel C. Lister, Jr. In the case here the result, such as has been described, I should say that this operation is an improvement on Pirogoff. I find that Pirogoff amputation gives better result than an amputation of the joint of the lower and middle third of the leg and Dr. Smith operates I would regard as an improvement over the Pirogoff.

In the primary Chopart amputation in this case, we do not know whether the tendons of the flexor of the foot were bored. That I would make an important point in Chopart amputation. The supposed action of the strong flexor muscles attached to the tendons of the flexor of the foot bend the foot downward and make the entire part of the foot bend downward and a foot-drop a fibrous process of the dead atrophic plantar muscle results. That Dr. Smith obtained in this case before operated him but if he used the tendons of the flexor of the foot, he would be able to perfect a lot of the ankle and the patient would get a good result.

THE TREATMENT OF FRACTURES BY NAIL EXTENSION

A PRELIMINARY REPORT

B. FREDERICK G. DYAN, M.D., CHICAGO

THE purpose of this paper is to make a preliminary report upon a series of cases treated by the nail extension known as Steinmann's method. The rapid development of the treatment of fractures and the bewildering rapidity with which new methods have been proposed within the past few years prove that the treatment of fractures is still in the developmental stage, and also demonstrates a renewed interest in this subject which roentgenology has brought about. If one may take Hoffa's statement as correct that two-thirds of all invalidism is due to fractures, it is only fitting that a subject of such great economic importance should receive a proportionate share of attention.

Possibly the greatest interest in the operative treatment of unreduced fractures was stimulated by Lane. He leads that school which believes in an immediate complete anatomic restitution by open operation. The opposite school is led by Lucas Championniere who believes that fixation of the fragments is not the first consideration but preservation of function that to be obtained by immediate mobilization and massage. As Steinmann has pointed out each of these extremes is probably wrong, the ideal method being one which would include the good features of the early anatomic restitution and also mobilization of neighboring joints.

It is unnecessary to enumerate the vast number of methods used in the closed treatment of fractures. This subject may be dismissed with the observation that in many cases these old time honored methods suffice to bring about good functional and anatomic results. The open operation which has literally been done to death in the last five years, especially in the hands of those who are not equipped either by training or environment to properly execute the technique involved in a procedure in which the element of infection is so great a hazard, requires only the statement which I believe will receive the support of every experienced surgeon that open operation must necessarily carry with it the danger of infection. Infection is frequently disastrous to the limb and often to the life of the patient. Therefore, open operation must be strictly reserved for that class of cases which is not amenable to other methods of treatment.

As Anschuetz observed the nail extension of Steinmann is to be regarded in the light of a compromise measure between the frequently inefficient closed method and the hazardous open operation. The nail extension method was not original with Steinmann who got his idea from the Malgaigne hook so familiar in the pages of textbooks on surgery. This apparatus resembled nothing so much as a pair of ice tongs. Heinecke later invented an instrument which was quite similar in the blades, handles, and direction of pull to an obstetric forceps.

Codivilla in 1903 used an extension by means of plaster of Paris which adhered well in many cases, but the tendency of the plaster of Paris was to produce a pressure necrosis.

From these methods Steinmann developed his procedure which he described as a method of extension which exerts a continuous traction exclusively by the aid of nails or screws which are driven either in or through the bone whenever possible through the lower fragment. The original method was to drive a nail transversely through the lower fragment. This later was modified and two nails were used, one on each side being partially driven through.

The method of the introduction of the nail has been modified at various times. First the hole was drilled through the bone and the nail introduced through this drill hole. Another method was by preparing a nail with a square head which could be received into a brace and bored through exactly as a carpenter might with a brace and bit. This method is probably the best. However it is quite possible to introduce the nail in the first manner by simply driving it through with the hammer.

Various types of nails have been used both by Steinmann and other operators, but experience has shown that the simple round nail with the sharp point answers every purpose. A special extension apparatus to be applied to the nail itself was devised by Steinmann, but the copper wire loop is quite as useful.

The point of introduction of the nail is of great importance. It is a cardinal principle in the treatment of fractures to postpone operative procedures until the inflammatory reaction or hematoma has at least partially subsided. Thus

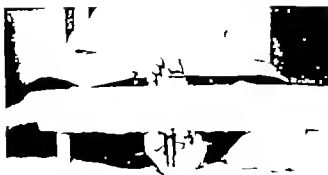


FIG. 1. Showing patient in bed with horizontal line indicating point of nail through skin.

holds true equally well for the nail extension because the introduction of the nail necessarily converts a simple into a compound type of fracture and adds a foreign body. Therefore in selecting the point for the introduction of the nail avoid if possible areas in which the soft parts have been traumatized and endeavor to utilize a portion of the bone which will not invade the medullary cavity. A situation close to the epiphyseal line is ideal except in the case of children and young adults in which epiphyseal ossification is incomplete. Furthermore it is desirable to avoid injury to the joint capsule which can usually be done by a consideration of the anatomy of the parts before introducing the nail.

The technique of the procedure is as follows: The skin is disinfected in the usual way. A small tenotomy incision is made down to the bone. Usually it is possible to select a site in which the bone is almost subcutaneous. The edges of the small incision are held apart by suitable retractors; the nail grasped in a heavy forceps is introduced through the tenotomy incision until it comes in contact with the resisting bone. The point of the nail is then given a suitable direction and forced through either by the hammer, the hand drill, or an electric motor. It is a good plan to have an assistant make pressure upon the opposite side of the bone with a wooden block covered by sterile linen to receive the shock of the hammer blows or the drill force. When the skin is seen to be elevated upon the opposite side a second small incision is made and the nail forced through further until an equal part protrudes upon each side of the bone. A collodion dressing is then put upon each wound. This is covered by sterile dressings, a sterile copper wire loop attached and finally the limb held in place by a sterile roller bandage.



FIG. 2. Patient in bed and horizontal line indicating point of nail.

In our work this procedure has always been carried out under general anesthesia. However Steinmann, Anschuetz and other report success with local anesthesia it being claimed that the only pain arises from the soft parts and periosteum.

Traction is then applied to the wire loop by means of a rope which is run through a pulley and a suitable weight attached the amount of traction being controlled by frequent X-ray pictures. The direction of the traction can always be modified in such a manner as to exert the pull in a line continuous with the long axis of the fragment involved.

It is unnecessary to take up in detail the various situations in which a nail may be introduced. Suffice it to say that it can be used both in the upper and lower extremities. However its chief field for use is in the lower extremity because of the necessity of overcoming the shortening coincident upon the contraction of the heavy muscles of the thigh and leg.

The nail may also be used as a lever. This may be accomplished in one of two ways. For instance in outward rotation of the lower extremity in fractures of the neck of the femur in which suitable inward rotation cannot be obtained. A nail driven into the great trochanter of the femur in a line parallel to the long axis of the



Fig. 3. Roentgenograms of Case before and after application of nail extension for fracture of the right tibia and fibula.

neck of the femur and attached to a rope and weight running through a pulley will tend to bring about and maintain overcorrection of the outward rotation.

Another method of using the nail as a lever is by hanging a weight on one or the other end of the protruding nail thereby bringing about rotation in the direction desired. The duration of the traction is governed by the amount of correction of the pre-existing deformity. The optimum time is eighteen to twenty-one days. During that period a certain degree of pressure necrosis takes place and this is usually more than enough time for the correction of the overriding of the fragments if sufficient weight has been applied. The pressure necrosis makes the removal of the nail easy because of the increased caliber of the nail hole. The nail may remain *in situ* however for a considerably longer period of time depending upon the judgment of the surgeon. However the danger of infection necessarily increases with the duration of time. One case was reported in which because of the intensity of the traction the nail cut through the os calcis, in which it had been introduced too near the plantar surface exactly as a dull knife would cut through butter. The nail was removed, no infection took place and healing occurred without complications.

The intensity of the traction is determined by the progress with which the deformity is overcome. Ordinarily the discomfort resulting from any traction necessary to overcome the deformity is not great and speedily diminishes.

Lateral dislocation of the fragments may be treated with the extension in place by means of

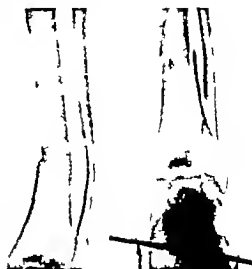


Fig. 4. Roentgenograms of Case showing position of fragments before application of nail extension and after.

a loop of adhesive passed around the offending fragment and attached to a weight and pulley. Dislocation of the fragments in the longitudinal direction with complete separation of the fractured ends is possible because of the great traction exerted and must be carefully watched by the roentgen control.

It is perfectly possible with the nail extension to keep up functional treatment. This is a great point in favor of this method. Another advantage is in the treatment of compound fractures because of the fact that the nail introduced frequently at a point rather remote from the place of fracture it is possible to begin the treatment before the infection has subsided thus gaining much time. Furthermore it gives perfect access to the wound and thereby permits of frequent dressings. It is especially indicated in those types of fracture which are not recent and which are complicated by considerable overriding. The longest time at which the method has been used for this class of cases is in one reported by Anschuetz, in which the nail extension was applied to an ununited fracture 142 days after the accident, and a good functional and anatomic result was secured. In alcoholics and demented individuals it has also the advantage over many methods that it cannot be removed by the patient.

Among its disadvantages may be mentioned first the danger of infection. However as the nail is frequently introduced through the os calcis, a bone which has no medullary cavity and

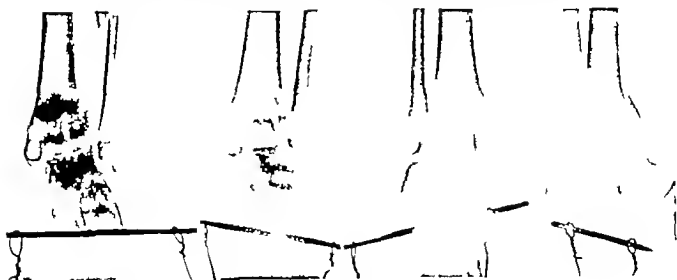


Fig. 5. Roentgenograms of Case 3 showing fracture of both leg before and after application of nail extension.

which, because of that fact, is hard to infect, the danger from that source in fractures of the leg is very slight. It is true that the danger increases with the introduction of the nail in the long, hollow bones, but if the precautions outlined by Steinmann are borne in mind, this is relatively light.

A second objection is the apparent brutality of the method. This is altogether theoretical and not real. Our experiences with a number of cases so far have demonstrated the fact that there is no more discomfort with the nail extension than with the Buck's extension in many cases, not as much. It is true that fatalities have resulted from this method, as from any other open method of fracture treatment, but the proportion of infections resulting from the nail extension as compared to the radical open operation we believe is very small.

Injuries to the soft parts may result from the introduction of the nail. In Case 3 of our series, a nail perforated the posterior tibial artery. The incision was scarcely enlarged, the vessel picked up and ligated, and no unfavorable results occurred. This has occurred in a few reported cases, but in no instance was any permanent damage caused. Decubitus in the region of the nail hole has been reported but did not occur in any of our cases. Because of the intensity of the traction exerted, it is possible to cause an overcorrection, that is, a separation of the fragments in a longitudinal direction. This may be controlled by frequent X-ray examinations and is easily reduced by lessening the amount of traction. The enormous traction also may be utilized for the lengthening of the soft parts

where contraction has resulted from improper reduction and immobilization at the time of the injury. This is a great help in the treatment of old fractures.

Lateral dislocation is frequently overcome simply by the traction in the direction of the long axis of the limb, the tendency being for displaced fragments to fall into position when the intensity of the traction is sufficient to overcome the overriding.

It has been argued by some that the method delays union because of the tendency to separate the fragments. This is a purely theoretical objection because the traction is released as soon as the deformity is overcome and a permanent fixation dressing such as a plaster cast is immediately adjusted. We have not observed this in our cases.

Among the advantages of the method may be mentioned first that from a mechanical standpoint no other procedure can be expected to produce as strong traction. It is not more painful to the patient than less efficient methods. The traction is exerted directly upon one fragment and not merely upon the soft parts. The traction exerted by the familiar Buck's extension is exactly comparable to making traction upon the arm by pulling upon the coat sleeve. There is no direct pull upon the fragment.

In those fractures of long bones in which one fragment is very small, as in fractures of both bones of the leg near the ankle, it is of great advantage to apply traction in such a manner that only a small area is needed for the attachment of the traction apparatus. No plan has yet been devised which requires so little space for its

attachment as does the nail extension of Steinhmann. This is of further importance from the fact that it permits free access to open wounds in compound fractures.

I wish to refer to a few case histories of patients treated in Cook County Hospital by this method.

CASE 2. The patient male suffered fracture of the right tibia and fibula about hand breadth above the lower articular surface of the tibia, also fracture of the internal malleolus. The fracture of the tibia was spiral and there was an overriding of the fragments of about an inch and half. Repeated attempts at reduction under anesthesia by various methods failed to reduce the fragments.

December 8, 1915 under ether anesthesia and most careful asepsis, a small tenotomy incision was made over the os calcis on its inner side. At this point a wire nail six inches long was driven through the bone transversely to its long axis, and at this point where the traction was applied could exert pull on the lower fragment of the tibia, bringing it into alignment with the upper fragment. The nail protruded about two inches on each side of the wound. The wound was sealed with collodion and sterile dressing applied. A copper wire loop was now attached to each end of the nail and extension made by means of a rope and pulley attached to this copper wire loop.

Traction was kept up for eighteen days. At which time the nail was removed, the roentgenogram showing complete reduction of the overriding. There was little lateral displacement. A plaster cast applied for three weeks more. At the end of which time the patient left the hospital with splendid functional result and no shortening. There was no infection and the patient complained of no pain (Fig. 5).

CASE 3. On December 8, 1915, patient presented himself to the County Hospital with fracture of both bones of the right leg at about the junction of the lower and middle thirds. There was overriding of the fragment of about one inch. Two attempts were made under ether anesthesia to reduce the deformity but were unsuccessful.

On December 3, under ether anesthesia and careful asepsis, large incision was made transversely through the os calcis after making small tenotomy incision on each side. A cotton block covered by sterile towel was braced against the opposite side from which the nail was introduced in order to take up the shock caused by the hammer blows. The nail was introduced so that an equal amount protruded on each side of the leg. The wound was then sealed with collodion and sterile dressing applied. A copper wire loop was attached and held in place with rubber bandage.

The traction was left on for three weeks at the end of which time the roentgenogram showed perfect anatomic reduction. The nail was removed, the wound sealed with collodion, and plaster cast applied for three weeks more. At the end of this time it was removed, and examination showed strongly united bones. There was no infection in this case and the patient complained of no pain (Fig. 4).

CASE 4. A fifteen-year-old girl jumped from the third-story window of the County Hospital and sustained a fracture of both bones of both legs (Fig. 5). On the right side the fracture was compound. On the left side there was separation of the lower epiphysis of the tibia. This girl was very much below par mentally and at the time of her attempt at suicide she was being treated for some drug habit. For three weeks subsequent to her injury she was treated by placing both legs in fracture boxes

and dressing the wound daily. She would allow no attempt to be made at reduction. Consent was obtained from her parents to use the nail extension.

She was anesthetized and the nail introduced the usual way on the side of the compound fracture. Upon the opposite side an assistant was allowed to introduce the nail but missed the bone and drove it through the plantar fascia and peroneum as was shown by an X-ray examination at a later time. Considerable trouble was experienced with this girl, who complained of suffering great pain both legs at the point of entrance of the nail and color as less than her complaint when the X-ray revealed one nail in the plantar fascia. This nail was then removed and no further attempt made to apply the nail extension on that leg. However by cutting and breaking she finally induced a flow the traction to be made upon the right leg. The nail remained in place for four weeks upon this side because of the fact that there were four points upon which she could allow no right to be attached to the rope. Upon other days she could allow eight or three or four breaks, depending upon her humor. The second site of the compound fracture healed kindly, the roentgenogram showed complete reduction of the overriding of the fragments and the patient obtained splendid functional result upon this side.

On the left side she was able by anesthetizing her again to get the fragments into fair good shape and broke them by means of the nail. The nail allowed to remain on for four weeks on each side.

The girl now has a functional limb. Upon the side on which the nail extension was used there is no apparent deviation from the normal. Upon the opposite side slight deformity is present but she is undoubtedly able to walk about limp. In this particular case I believe there was no other way in which this fracture could have been so successfully treated.

CASE 5. A man twenty-seven years of age came to the County Hospital in January, 1916. He had just spent four weeks in another hospital under treatment for fracture of the middle of the femur with overriding. This was treated in the ordinary way by simple traction extension. A roentgenogram showed after four weeks that there was no reduction of the deformity and the patient presented himself for treatment.

He was an intelligent man and he explained to him that he had the choice of two methods of treatment, one the open operation with the bone transplant, or traction by nail extension. After some lying he consented to be the fracture treated by the nail extension method.

He was anesthetized and the lower end of the femur was prepared in the usual way.

A small tenotomy incision was made low down over the external condyle, a point where the bone is almost subcutaneous. The nail was driven through until it emerged through the internal condyle. The wound was sealed with collodion dressing, a wire loop applied and traction made with the limb resting upon double inclined plane in such manner that the line of traction was direct line with the long axis of the femur. In order to bring this about, a piece of two-by-four was made fast to the foot of the bed so the same side as the fractured limb. A cross arm was nailed upon this and pulley attached to the cross arm about foot from the main piece. This enabled him to be in bed with the limb in position of moderate abduction, as this position is most comfortable. A weight of five and some times six bricks was attached for three weeks. The patient at first complained of some pain in the region of the fracture. It was noted in roentgenogram made at the time of his admission that there was considerable callus at the point of fracture and an overriding of about an inch.

The pain soon subsided and the patient expressed himself as being more comfortable than he had previously been with the Buck extension applied.

At the end of three weeks the nail was removed, the twenty-eight inch long board that the extremity had been in was removed. The lower extremity was then put in a cast reaching from the axilla down to the toes and taking the opposite limb as it was the knee. At the expiration of six weeks this cast was removed and it was found that the patient had complete bony union of the fracture with no deformity. Measurement showed the circumference of the leg to be less than half an inch. There was no infection at a time and the patient did not complain of any severe pain.

CASE 5. A male aged thirty-nine sustained a comminuted fracture of the middle of the tibia with about an inch and half overriding of the fragments. An attempt at reduction was made by traction, repeated a plaster cast which had been applied to the tibia and a weight attached to the rope. On examination of the distal tibia showed a red union of the distal tibia.

At that time under the anesthesia, nail was driven through the os tibia and weight attached in the manner already described. At the end of sixteen days, fifteen grams showed that the distal tibia was perfectly united over os tibia except that there was a little backward bending. This was easily corrected by pulling up under the portion of the bone. The nail was removed and the limb put up in a plaster cast. Union has not yet occurred.

CONCLUSION

Advantage 1. It is less laborious than the radical open operation.

It enables the surgeon to exert the maximum amount of traction while using the minimum area for the attachment of the traction apparatus.

It will bring about a reduction of the deformity in old cases where other methods fail.

4. The technique is not difficult and can be mastered by anyone. Therefore the method is practical and can be used by the entire profession.

It gives access to wound in compound fractures permits frequent dressing and dressings away with unclean infected traction apparatus.

Disadvantage 1. Apparent brutality of the procedure. This is not real however as the patient suffers no more by this traction than by any other method.

Danger of infection. This is less than the danger of an open radical operation.

Hemorrhage. This may occur but can always be readily controlled by enlarging the incision and tying off the bleeding point.

CONTINUAL STOMACH LAVAGE AND CONTINUOUS HYPODERMOCLYSIS IN PERITONITIS PERSISTENT VOMITING WITH DEHYDRATION AND DILATED STOMACH

WITH A DESCRIPTION OF A MODIFIED STOMACH TUBE

By ALLEN B. KANAVEL, M.D., CHICAGO

THE separate or combined use of continual stomach lavage and continuous hypodermoclysis in the dehydration and toxæmia incident to peritonitis has proved itself of such signal benefit that it would seem to be worthy of wider appreciation. It has also been used with great satisfaction in persistent vomiting of any type in dilated stomach after operation, and in similar states while the continuous hypodermoclysis in addition to being used in combination with the gastric lavage may be used in dehydration and toxæmia from any cause. To make the procedure available certain changes in the ordinary technique have been devised.

STOMACH LAVAGE

For urgent purposes a stomach tube modified from the Einhorn and Rehuss types has been devised. This modification is necessary since we wish a tube that can be inserted in the stomach

and left in position days if necessary; moreover the tube should be one that can be introduced without the active co-operation of the patient. Since it should be available even though the patient be nauseated and vomiting continually or be fully anesthetized.

The tube and its carrier are constructed as follows. The bulb is of the same size as the Rehuss bulb except that the lumen of exit is larger and it is so constructed that it is impossible for the wire carrier to slip out. The rubber tubing is of the same size as the Rehuss tube but only 30 inches long being attached to a second heavier tube 12 inches long by a screw lock. A carrier of piano wire is made to fit the first tube so that it can be introduced without difficulty. The second tube is attached after the removal of the carrier and the contents of the stomach aspirated or siphoned off.

If the patient will swallow the tube the lumen

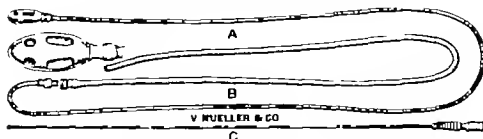


Fig. Stomach lavage tube, bulb and wire carrier

of exit of the bulb being larger than the Rehfuss tube the stomach contents can be aspirated with greater freedom and the mucus interferes less. This latter is of considerable importance in post-operative lavage when the mucus is generally considerable and interferes even with this tube at times. It will be seen that the bulb is so constructed that the point of the wire carrier cannot slip out of the bulb and injure the stomach. Owing to the shortening of the rubber tubing, there is less probability of the collapse of the tube upon suction and there is less difficulty in removing the carrier. This latter procedure is also aided by having the patient throw his head back thus lessening the sharp angle in the tube.

The tube described has proved of signal benefit in the vomiting of peritonitis or persistent vomiting from any cause as well as being of great aid in the routine examination of stomach contents for diagnosis. In the former instance the tube is either introduced by the surgeon, or is swallowed by the patient. It is then attached to the chin by a piece of adhesive plaster and may be left in for days. In the regurgitation incident to peritonitis, the stomach contents are aspirated every half hour to an hour and at regular intervals the stomach is washed out by injecting soda solution, or other liquid, through the tube and aspirating it. Between the washings the end of the rubber tube attached is placed in a basin with the end covered by fluid so that a continuous siphonage takes place. The retention of the tube is without discomfort, while the absence of stomach distention and vomiting gives the greatest relief to those distressed patients.

Fluid may be left in the stomach or medication given if desired. In one patient with peritonitis who was apparently moribund the tube was kept in the stomach four days and the patient did not vomit after the treatment was begun although he had been regurgitating large amounts previously. In addition to being used in peritonitis cases it has been used in persistent vomit-

ing from any cause, as paralytic ileus, gastritis, toxicemic vomiting etc. In such patients after washing the stomach for a day or two small amounts of liquid food are introduced and if subsequent suction shows that the food is being absorbed or is passing the pylorus, feeding is increased. Thus without discomfort to the patient we give food at the earliest possible moment.

If the tube passes the pylorus, as it may do upon the resumption of the normal stomach peristalsis, the duodenal contents are then aspirated which may be of benefit in some cases. It has occurred to me that it might be possible to carry the tube through a gastro-enterostomy, opening at the time of operation and thus aspirate intestinal contents or introduce food. I have not attempted this, however.

CONTINUOUS HYPODERMOCLYSIS

In patients suffering from dehydration from any cause or from toxæmia, the administration of large amounts of normal saline during several days has long been recognized as of great value. The administration of this at stated intervals, calling for the reinsertion of the hypodermoclysis needles, thus distressing the patient and entailing much work on the part of the surgeon has militated against its more common use. To obviate this the following technique has been satisfactory. The ordinary hypodermoclysis set has been used with the exception that the needles are much finer than are those commonly attached and provision made so that the solution can be shut off from either needle. The needle chosen is four inches in length, No. 20. The assistants are impressed with the fact that no pain must be given the patient either during the insertion of the needles or the administration of the solution. To obviate this the skin is bilatered with a few drops of novocaine ($\frac{1}{4}$ per cent solution) using the finest hypodermic needle then a few drops of the same solution is forced along the course we expect the

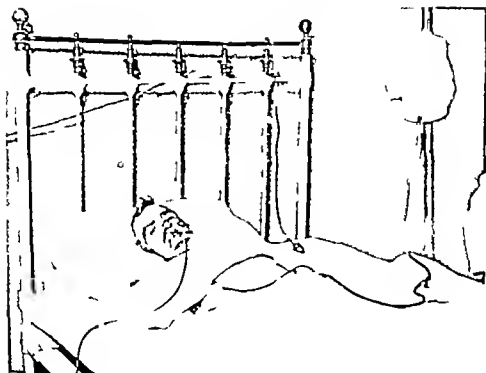


Fig. 2 Showing application apparatus

needle to follow in the deeper tissue. The point of a fine sharp hypodermoclysis needle is then placed against the skin and gently rotated with firm pressure. This carries the needle in absolutely without pain. After being in place the head is wrapped in gauze so that the flange does not touch the skin and cause pressure and the needle is fixed in position with adhesive plaster. The solution is kept warm by frequently refilling the can or using a sterile hot water bottle in the can. The solution is allowed to drop in slowly never distending the tissue to the point of pain. Whenever the patient says there is a sense of fullness the rubber tube on that side is shut off.

In this manner we have frequently given continuous normal salt solution for three to four days with no disfigurement or ill consequences to the patient. We have used it in children without the slightest complaint on their part. Its use has become a routine in all cases of persistent vomiting and toxæmia as peritonitis, ileus, perniculous vomiting of pregnancy, toxic nephritis, septicæmia, etc. In debilitated patients we have inserted the needles and begun hypodermoclysis at the beginning of an operation and returned the patient to bed with the needles in place and

continued the administration indefinitely. We have used it supplementary to rectal administration of tap water and in those cases where owing to the nature of the operation, e.g., intestinal resection, this could not be used. As an example, Examination of the charts shows that in a seven year old child, Wesley Memorial Hospital No. 56,931 suffering from paralytic ileus 4000 ccm. were given over three days, and in a patient with general peritonitis, Wesley Memorial Hospital No. 57,388 following appendicitis in a young man 9000 ccm. were given over four days. And in another patient, Wesley Memorial Hospital No. 59,154, much dehydrated from persistent vomiting 13000 ccm. were given in 44 hours.

In cases where the heart is growing weak there has been at times a tendency to water logging of the tissue. Therefore such cases are watched carefully so that on the one hand this will not occur and on the other we shall not overload the circulation and strain the heart.

The benefit patients suffering from peritonitis have derived from the combined use of continual gastric lavage and continuous hypodermoclysis is far beyond that secured by any other procedure with which we have had experience.

THE USE OF ELECTRIC LIGHT AND HYPOCHLOROUS ACID IN THE TREATMENT OF WOUNDS

B. GEORGE W. CRILE, M.D., F.A.C.S., LL.D.

CHICAGO

FOR some years the electric light has been utilized in the treatment of burns and in the literature we find occasional mention of the efficiency of electric light treatment for obstinate ulcerating surfaces, such as varicose ulcers, etc. Apparently however the wide applicability of this treatment has not been recognized if one may judge by the paucity of the literature under this heading. Chaput, writing in 1914, states that the wide usefulness of electric light baths was discovered by him during a dark season in which sun baths were unavailable. In many kinds of cases he therefore tried the effect of exposure to the light of a fifteen-candlepower electric lamp applied daily or every other day for hourly periods. As a result of these trials, he found that in the ordinary electric lamp we possess a simple, practical, economical, and very efficient means for treating obstinate ulcers, and infected and gangrenous sores. Chaput predicted also that this conception would find its application in the treatment of certain complications of the wounds of war.

Last year at the American Ambulance in Paris, Dr. Winchester Dubouchet called my attention to the value of electric light in the treatment of infected wounds. Dr. Dubouchet used ordinary

electric lamps, single or in clusters with or without reflectors, the treatment in each case being continued night and day. We gave the method a trial on my service and secured so much better result than by the use of dressings that upon the return of the Lakeside Unit from France we introduced this treatment in Lakeside Hospital and observed its effect upon various types of wounds.

What the experiences of war had proved to military surgeons soon became obvious to us, i. e. that little if any advance in the treatment of infections had been made in many years. We soon realized also that the real reason for the efficiency of the electric light treatment lay in the fact that Nature's own method of promoting repair is thus produced artificially as is demonstrated not only by Chaput's successful substitution of electric light for sun baths, but far more strikingly by the remarkable facility with which wounds heal in desert places. For example in Arizona, where the air is dry and rare and the rays of the sun are direct and strong the carcass of an animal does not readily decompose. In this region, tuberculosis is easily cured and tubercular lesions of the skin and superficial parts heal rapidly.

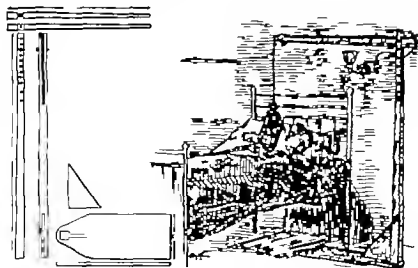


Fig. The Fuller adjustable bracket for applying electric light treatment to wounds.

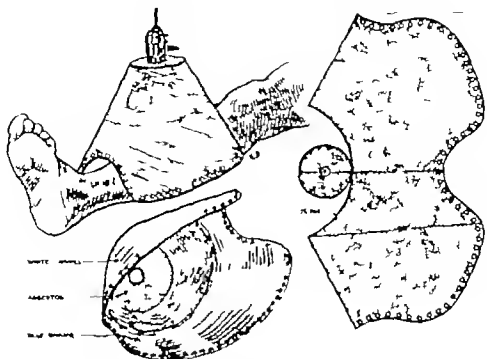


Fig. The Bell metal band for electric light

Analysis of sunlight and of ordinary electric light show that they are practically identical. In view of these facts, although we have recognized the therapeutic value of the Finson ray, the Coolidge tube, etc., we have been slow to appreciate that by simply utilizing the radiance and warmth of the ordinary electric lamp, we may bring the dryness, the heat, and the light rays of the desert to the wound to promote its healing.

The omissions of dressings in itself is an important factor in the success of this method. Sir Berkeley Moynihan has stated that the average dressing of a suppurating wound is in effect a pus poultice. Indeed, until I observed the behavior of wounds exposed to the air it had not occurred to me that in dressed wounds the greater part of the discharge was due to the irritation of the dressing.

It is not my purpose here to discuss the theories which may explain the value of heliotherapy, or electric light thermotherapy. These are sufficiently presented in current journals, especially those devoted to electrotherapy and radiology. Nor shall I present the chemical formulae and reactions which indicate the reasons for the efficiency of hypochlorous acid as an antiseptic cleansing agent. These are fully discussed in articles by Dakin and Carrel. My purpose in this paper is to describe the manner in which we are applying electric light treatment and hypochlorous acid in a variety of cases. An apparatus devised by Miss Fuller and Dr. Bell

of the Lakeside Hospital (Figs. 1 and 2) in which electric lamps placed in pasteboard containers or in metal hoods are suspended from an adjustable frame has proved a practical and comfortable means for applying light treatment to wounds of the neck, chest, shoulder, arms or legs. For abdominal wounds, the lights may be suspended from a cradle. The amount of light and the proximity of the lamps to the wounds are governed by the comfort of the patient. For the necessary cleansing of the wounds, we use Dakin's solution¹ or Wright's solution.²

Osteomyelitis. In cases of osteomyelitis a temporary pack is placed over the wound immediately after operation to prevent oozing. After a few hours this is removed and the undressed wound is exposed to several electric light bulbs suspended under a cradle (Fig. 3). The bulbs are near enough to the wound to subject it to comfortable warmth. Secretions from the wound are cleansed with Dakin's solution and if coagulated serum develops, a hot pack with Wright's hypertonic solution applied for half an hour more cleans up the field. In some cases the exposure to the electric light is continued both

Dakin's Solution—
Dry sodium carbonate
Chlorinated lime
Tap water
Mix and filter through cotton
Add 40 grains boric acid

500 grains
40 grains
lit.

Wright's Solution—
Sodium chloride
Sodium citrate
Water

5 parts
1 part
94 parts

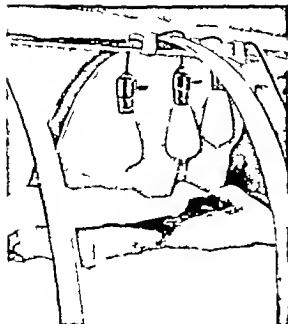


Fig. 3 Case of osteomyelitis under electric light treatment.

night and day. Aside from the hot pack and Dakin's solution, no other dressing or antiseptic is employed. Our experience with the electric light treatment in osteomyelitis has demonstrated three outstanding advantages: the wounds heal more rapidly, much less dead bone appears, the wound discharge is markedly decreased.

Open granulating wounds. That skin grafts do better without dressings is well known, but under exposure to electric light not only cases requiring skin graft but all open granulating surface wounds show increased healing power.

Open tuberculous abscesses. We find that during the first night it is best to pack a tuberculous abscess in order to establish an open wound. After this, these cases do well under hypochlorous acid cleansing, the X-ray being used also while the wound is wide open. We have found that many of these wounds may be sutured within five days, and that fairly good primary healing follows.

Deep drainage. In cases requiring gall-bladder, appendiceal, or pelvic drainage, we find that they progress well under intermittent exposure to electric light and that the patient is much more comfortable under the heat and light.

Cancer of the mouth. After the excision or cauterization of cancer of the mouth, hypo-

chlorous acid is especially useful because it is a deodorant, and not an irritant or a poison.

Empyema. The malodorous properties of empyemata are splendidly controlled by the injection of hypochlorous acid.

Acute infections. In the treatment of acute infections of the joint and of the deeper soft parts, the combination of a continuous irrigation with Dakin's solution through multiple drainage tubes, with exposure to a cluster of electric lights produces excellent results. In severe acute cases the drip irrigation should continue by night as well as by day. Wright's solution also is efficient in these cases.

Aseptic closed wound. We have made a number of observations of the effect of exposure to electric light on aseptic closed wounds and have found that the patient was much more comfortable than with dressing, and that the wound healing was at least as rapid.

CONCLUSION

All living tissue attempts to encyst or to cast off foreign bodies of all kinds. No one would consider the advisability of putting a gauze dressing on a corneal ulcer and yet the violent reaction of the eye to a foreign body differs in degree only—not in kind—from the reaction of living tissue to dressings anywhere. We know that we dare not pack gauze on suture lines, not drain fractures. We know that nails and screws cause the absorption of bone, that any aseptic wound with drainage discharges much fluid, that wounds roughly handled during operations discharge more fluid than clean cut wounds. We know how difficult it is to bury steel plates in bones, to bury heavy silk in aseptic wounds. From the benefits of dressings must be subtracted all the resultant ills—irritation and discharge added, necrosis, pain, and discomfort. Frequently changed hot dressings are more comfortable than plain dressings and perhaps produce less pus, but if applied too long they tend to waterlog the tissue. Moreover the wet hot pack gives no different quality of heat than does the electric light, and the heat from the electric light penetrates quite as readily as the heat from the hot pack.

Wounds heal best when infection is hindered or destroyed by the agent least harmful to the tissue and without the irritation of foreign bodies in the form of dressings. All these ends are served by the use of hypochlorous acid solution and by exposing the undressed wound to constant light and warmth.

THE APPLICATION OF THE SEWING MACHINE STITCH IN GASTRIC AND INTESTINAL ANASTOMOSES

BY E. P. QUAIN, M.D., F.A.C.S., BISMARCK, NORTH DAKOTA

THE illustration presented herewith demonstrate a needle devised by the writer for the purpose of applying a double interlocking suture in gastro-enterostomies and enter-enterostomies. The needle is threaded as shown in Fig. 1 and the other end of the catgut is tightened to a blunt straight needle. The needle is pushed far enough through the two structures about to be sutured serosa-to-serosa fashion so that the eye near the point clears the distal

mucosa by about one fourth inch. The straight needle with the other end of the catgut is now put through the catgut loop near the mucosa as in Fig. 2. The first needle is withdrawn and the stitch pulled tight.

After the suture of the posterior edge of the anastomosis has been completed the stitching is continued back along the anterior margin as shown in Fig. 3.

The two advantages gained over other methods of suture in gastric and intestinal anastomoses are first absolute hemostasis and second saving of time.



Fig. 1

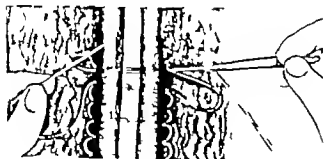


Fig. 2

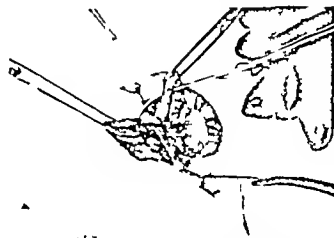


Fig. 3. Photograph showing anterior half of gastro-jejuno-stomy. The needle is passed into the jejunum out through its serosa and then across the gastric margin which is penetrated in reverse order. The first loop is picked up with the other needle in the gastric mucosa as in Fig. 2. Pulling the two end taut makes firm serosa-to-serosa approximation.

A DETACHABLE APPLIANCE FOR THE CONVERSION OF THE OPERATING CYSTOSCOPE INTO A DOUBLE-CATHETERIZING INSTRUMENT

By P. S. PELOUZE, M.D. PHILADELPHIA

Cystoscope, Urological Department, Jefferson Medical College Hospital

WHEN one tries to pass two ureteral catheters through the Buerger operating cystoscope which is the one most generally used in this country he finds that they stick to each other kink in the channel, and do various other things to promote failure. After a few such experiences, he realizes that the instrument was surely not intended for double catheterizations, and is compelled to resort to the instrument especially designed for such work. A study of these two instruments will show that, as far as the outer sheaths are concerned, there is really no essential difference and as regards the periscopes, the only important difference is that that of the double catheterizing instrument

for which it was made, but it increases the range of intravesical procedures at one passage of the instrument, a point very gratifying to most patients.

One field in which I have found it of particular value is that of separate renal function tests. During such a test the study of the separate urines is of greatest value and it is usually a simple matter to collect them. A number of disappointments in separate efficiency tests has shown me the futility of looking for accuracy in such tests by inserting No. 5 or 6 F catheters into both ureters. The leakage into the bladder during the test period is generally so great as to render the readings useless, as it is impos-



Operating cystoscope with detachable fin by which instrument can be connected with double catheterizing cystoscope

has a fixed fin to divide the unoccupied lumen of the sheath into two separate catheter channels.

Usually the double catheterizing scope is purchased first, the necessity for operating arises, and the physician learns that he must buy an entire new instrument. The similarity in the outer sheaths makes a part of the investment appear unwarranted, but each periscope fits its own particular sheath and there are no universal fits.

To overcome some of these difficulties, I have devised a detachable separating fin which makes it possible to convert in a moment's time, the operating cystoscope into a double catheterizing one that works equally as well as the one made for that purpose. This little appliance is so well illustrated in the accompanying cut that it needs no description.

Not only does it admirably fulfill the purpose

able to state positively from which kidney it came. On the other hand, if one collects his urines for study withdraws the catheters, removes the fin, and inserts the tapering Garceau catheter into one ureter until it entirely fills its lumen and collects the other kidney's urine from the bladder there practically ceases to be a margin of error to consider.

The addition of this appliance to the operating cystoscope, in short, gives one all of the range of usefulness of two models and at a cost very little above the price of a single instrument. While this may not make a strong appeal to the manufacturer, it makes an eloquent one to the physician who starts out to buy an outfit for cystoscopic work. As previously stated, there are no universal fits with these instruments, which fact, unfortunately makes it necessary to fit the attachment to each individual cystoscope.

TRANSACTIONS OF SOCIETIES

CHICAGO SURGICAL SOCIETY

REGULAR MEETING HELD MAY 5 1910 WITH DR. SAMUEL C. HUMPHREY
IN THE CHAIR

HYPERNEPHROMA OF THE LIVER

DR. CARL G. SWENSON presented a specimen of hypernephroma of the liver

POST OPERATIVE RESULTS OF SOME UNUSUAL CASES

DR. EMANUEL FRIEDMAN read a paper entitled Post-Operative Results of Some Unusual Surgical Cases, and exhibited patients

CONTINUAL STOMACH LAVAGE AND CONTINUOUS HYPODERMICOLYSIS IN PERITONITIS DEHYDRATION FROM VOMITING AND ALLIED CONDITIONS

DR. ALLEN B. KANAVEL presented a paper entitled Continuous Stomach Lavage and Continuous Hypodermoclysis in Peritonitis Dehydration from Vomiting and Allied Conditions (See p 451)

DISCUSSION

DR. DANIEL N. EISENDRATH Dr. Kanavel has presented an excellent idea because there is one factor in acute gastric dilatation (post-operative) that we are apt to overlook and which this tube will help greatly in removing. Everyone has probably noticed in cases of acute dilatation that after you have washed out the stomach and have not given the patient a drop of water by mouth, inside of three or four hours there will be an accumulation of more or less fluid again. It took me quite a while to understand that this is due to hypersecretion from the gastric mucosa. There is very little or nothing said about this condition in the literature. It is a sort of gastrosuccorhoea. It seems to me a tube which is kept constantly in the stomach will help greatly because, after the preliminary washing out a suction tube will take care of the disagreeable hypersecretion.

There is one thing in this connection I would like to call attention to which we have observed recently and have tried to control as much as possible, and that is the determination of the amount of carbon dioxide. Dr. Wright is working out the relation between acidosis and gastric dilatation. Many of these cases are instances of acidosis and the

moment when an introl that has gradually increased our introl with a tube gastric dilatation

THE USE OF NAIL EXTENSION IN FRACTURES

DR. F. C. DAY presented a paper on The Use of Nail Extension in Fractures (See p 458) which was illustrated by numerous slides

DISCUSSION

DR. KEEL W. SPEED I would like to say a few words on this method because I have been using it for two or three years.

First of all the copper wire loop has a long history and I may as well tell it to you. In the first case in which I used this method I asked an interne to get a wire loop and put it on the nail. He was not able to get it. I told him to get a steel rod but he found copper wire which I had used before. I told him it worked so well that I adopted it in subsequent cases. For the nail I have been using a steel drill rod five sixths of an inch in diameter cut off at the required length. The traction on the nail can be relieved if the patient is distressed by moving it and replacing it. The nail also controls the amount of rotation to either side in fractures of the femur when applied to the femur itself. The nail becomes loose in the os calcis in about 15 or 20 days.

We have had two cases of accident in connection with the nail in the hole. In one on the third week the patient getting tired of the traction reached down and pulled the nail out but the interne discovered this quickly and by injecting a small amount of iodine in the hole through the bone we avoided any infection.

The second case was brought to the operating room for the removal of a nail as it had become loose. In fractures of the femur of which I have had but few cases, I have found the nail is not loose in three weeks. I use a much larger nail through the femur in such cases.

I have had one case with a result after three weeks by traction from the femur seemingly as good as that shown. The leg was put in a cast after that time and the fragments slipped back because the callus was not hard enough. In subsequent cases we found the results were better when treated for five weeks with a nail through the femur.

In the pictures Dr. Dyas has shown us in one case I am sure that the nail was not put through the os calcis. That does not make any difference, because if the nail is pulled very hard it may pull through the os calcis and impinge on the heavy plantar fascia and plantar tissues which will hold just as well as bone will. This method has been tried by putting a nail *not* through the bone itself, but in the space in the tendo Achillis and in the space in the os calcis and it works just as well.

The apparatus Dr. Dyas has shown you for foot drop it seems to me, is entirely unnecessary because when the extension is applied to the os calcis there is absolutely no tendency for the anterior portion of the foot to drop down. At least, I have never seen it. The os calcis itself, on account of its cancellous structure, lacerates under this type of treatment, and the nail is easily inserted.

I want to say a word about the intensity of the traction in the knee and ankle. The separation that was apparent in some of these cases is due to the stretching of the joint ligaments. That is not of a permanent character because after the traction is relieved the joint resumes its normal condition and there is no permanent damage done of which I know.

The results are not distinctly anatomical. I have never obtained a satisfactory X-ray picture of a case that showed anatomical reduction, but functionally the legs are brought into weight-bearing line and are very satisfactory.

Dr. WILLIAM FULLER. I think that almost any method of treating fractures will answer the purpose sometimes. However if we discuss methods their value cannot be correctly estimated unless we at the same time specify the particular kind of fracture in which we would employ a particular method.

While the Lane bone plate has fallen into disfavor owing almost entirely to its misunderstood principles and its indiscriminate use by those who should know better, as well as by those who do not, I still believe that this device has a very distinct and an important place in the treatment of fractures.

Instead of the intelligent application of many other measures now at our disposal in fracture work they are entirely misunderstood and are made use of under conditions which are often without the slightest justification. Strenuous efforts at traction and extension are often made where such are not needed, just as they are of least and the least consideration when they are needed.

As one writer has said we individualize too little in our treatment of fractures. No measure yet described is without some value somewhere, but in order to decide just what procedure should be followed, a careful diagnosis should always be made and every indication accurately determined. Then if we select the particular measure or part thereof which is rightly called for and display intelligence and understanding in the use of whatever that may be the end-results should be satisfactory.

The nail driven into bone for the purpose of traction, as described by Dr. Dyas tonight and by others before this, may have place in the treatment of fractures. But of all the maneuvers yet described I should not hesitate to give this one the last place especially when used as a means of affording traction. It necessarily offers some difficulties in placing it exactly in the bone as desired. It is in reality an open operation. It is liable not to hold when great traction is made upon it. It establishes a communication between an open skin at one end of the nail, and a bone lesion surrounded by damaged soft parts at the other end and what is of more importance than all other points combined is the use we can make of older and well-tried methods which call for no operative work and which hold just as well perhaps better. But notwithstanding these objections, Dr. Dyas has shown that the nail can be used advantageously. The nail for purposes of extension, the Lane plate, the bone plug, the transplant, the screws, the wire, all have some merit and can when judiciously employed be of service.

Surgeons have long hoped for a more rational means of treating fractures. That time will probably not come till the general medical man ceases altogether his efforts in this work, and when the general surgeon devotes more time and thought to it and exercises the same care and consideration as he ordinarily employs elsewhere.

There are more malpractice suits brought against members of the profession for their failures to satisfy the public in the treatment of fractures than in all other work combined. Why is this? It is because other surgical work is not done as blindly carelessly and unscientifically as is the treatment of fractures. In surgery of the head of the thorax, and the abdomen, ample room, good exposure and abundant light are demanded. The end results in the treatment of fractures will be no less so when we treat fractures on the same rational basis as is the rule in surgery in other parts of the body.

We cannot all agree with Dr. Dyas when he says that the nail sticking from the skin surface as he has shown here is as little likely to produce an infection as the open operation. The nail hole is virtually a drain track and we are familiar with some of the dangers attending these when located near clean wounds. Just how they can be less serious when made by a nail transfixing the broken limb and passing out to the surface to be occasionally toyed with as happened in one of Dr. Dyas' cases, is not clear.

In closing I would say that no device or measure should ever be used in the treatment of any fracture simply because it is new but only when they have shown unmistakably that no other device or method can serve the purpose as well.

Dr. DANIEL N. EISENDRATH. I would take exception to Dr. Dyas' condemnation of the lack of value of Buck's extension. If properly applied, Buck's extension is of the greatest value. It can

DR. C. G. BURTON: My experience with fractures has not been small. From the hysteria that has developed on the account of so-called improved methods in the treatment of fractures it might seem to those outside of surgical circles that fractures have been giving us a great amount of trouble and that we have been laden with damage suits. Such has not been my experience or my observation.

My methods have pretty generally been along the old plans of treatment, namely: attempt at simple reduction under anesthesia when necessary and the use of Buck's extension in the extremities when indicated. Simple fixation appliances have been used early and open or closed casts used as permanent dressings. I think I get as good results as can be obtained. I have no cripples running around, no complaints from the patients, and have never had

damage suits threatened connected with fractures. I rarely use the Lane plate or bone peg. When reductions are impossible and deformities are objectionable I usually do an open operation and approximate the fragments closing without drainage. Once the fragments are in position it is easy to hold them there. It is the fragments that are not in position which make it difficult to retain them in their proper position. I do want it understood that the Lane plate and bone peg, like other good devices, have their places in surgery but since their introduction I believe as most of you here believe that they invite too many operations and are used entirely too frequently. I have been amazed at the large number of plates and pegs reported from the services of men with relatively small amount of work. I feel that the nail brought out by Dr. Dyas is a good thing in its place. It will certainly have its field of usefulness. I have personally never had occasion to use it.

The special note which I desire to sound is: Do open operations if you must but leave fewer and fewer foreign materials in the wound.

DR. DYAS (closing): I want to give Dr. Speed full credit for introducing this method in the treatment of fractures at the Cook County Hospital. He was the first man to use it and with his permission I will say that when I began this work we endeavored to get a group of cases together which would enable us to make a report of some value by reason of the number of cases treated. He deserves full credit for the detailed technique which we have carried out in our work.

I knew my paper would be criticized but if surgeons are absolutely satisfied with the way they are going along in treating fractures and try nothing new they will never make any progress. I feel that our results have justified the work. It is our intention to treat further cases with this method so that we may obtain reliable information. We have not done any injury to any patient. We have not had infection in a single case. We have not had absolutely accurate anatomical results but we have had good functional results.

As to Buck's extension, I did not mean to condemn it to the extent that some of the speakers do but it is perfectly true from a mechanical standpoint that it is impossible for any one to expect to apply as much traction by means of adhesive plaster to the skin as can be applied by definite exact traction apparatus, such as the nail and copper wire and pulley extension. Buck's extension has a wide field of usefulness and always will have. The method I have described is not intended to supplant anything but it has its place with strict indications and I think the functional results will justify the use of the method.

THE CORRELATION OF THE CIVIL AND MILITARY SURGEON

DR. JACOB H. A. read a paper on "The Correlation of the Civil and Military Surgeon."

Clinical Congress of Surgeons of North America

SEVENTH ANNUAL SESSION

PHILADELPHIA

OCTOBER 23 TO 28 1916

CLINICAL CONGRESS OF SURGEONS OF NORTH AMERICA

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THE CLINICAL CONGRESS IN PHILADELPHIA

BY EDWARD MARTIN, M.D., F.A.C.S.

THE clinical meetings of the surgeons of North America have been characterized by an attendance which in many cases seriously threatened the security of the part of individual members of those bodies which they so willingly and in such great numbers sacrifice time of convenience, business and money to attend. There seems any escape from a species of universal manipulation other than by limiting the number attending to accord with the facilities for observation offered and by adopting a system founded on experience which assures each visitor his seat or place in the day.

This meeting for the second time in Philadelphia, is notable from a number of circumstances from that of the character of the men attending it—the urgent business of the country—each an influence in his own community—many with hospitals of their own, practically all operating surgeons who come serious-minded to better their work. None will go home feeling that they have so done some

with the profession in which they are engaged and in the knowledge that they have done so.

From these facts it is not surprising that the attendance has been so large. The attendance of the surgeons of North America at the Philadelphia meeting was the largest ever recorded. The attendance of the surgeons of North America at the Philadelphia meeting was the largest ever recorded. The attendance of the surgeons of North America at the Philadelphia meeting was the largest ever recorded.

In accordance with the practice which obtained at Boston and in accordance with the efforts which the Congress has done in the last better clinical records and following case their comparison, there will be a report of results to date. All operative cases before the visiting surgeons this morning.

presented at the next annual meeting of the Congress. This at times gives a better opportunity of estimating the true capacity of a surgeon than does a mere observation of his operative technique. Indeed it is the one criterion of a surgeon's ability and usefulness. Moreover the knowledge that such a report is required may in some instances induce a wholesome conservatism on the part of the operator which is in the main largely to the interest of the patient.

Incidentally Philadelphia has many excellent hotels a medical library at the College of Phys-

cians, second in completeness only to that of the Surgeon-General's and in its environs, within twelve miles of the center of the city more than a dozen golf links the latter readily made available to those who have inclination and time for the game during these busy meetings. It is scarcely needful to say that a cordial welcome awaits the guests from the Philadelphia profession who feel honored by the choice made of them stimulated by the hopes bound in them and will remain permanently bettered by association with the broad men from all parts of this broad country.

PLANS FOR THE PHILADELPHIA MEETING

On the morning of Monday October 23 in Philadelphia the Clinical Congress of Surgeons of North America opens its seventh annual session. The Congress headquarters at the Bellevue-Stratford will be open for the registration of members on the afternoons of Saturday and Sunday preceding and the program for Monday's clinics and demonstrations will be posted on Saturday afternoon.

The Philadelphia Committee on Arrangements, backed by the clinicians of that city are keenly interested to make a complete showing of Philadelphia's clinical facilities in every department of surgery including gynecology obstetrics genito-urinary surgery orthopedics, surgery of the eye ear nose, and throat. While the chief attraction will be the clinics in the operating rooms of the thirty or more co-operating hospitals, a series of demonstrations—pathological roentgenological borderline subjects, and others—has been arranged by the committee and it is expected that this portion of the program will prove of exceeding interest.

The clinical program appearing on the following pages is only suggestive of what the Philadelphia clinicians have in mind for the week of the Congress. The daily program as bulletined at headquarters will be elaborate and accurate in detail as to the cases to be operated upon or demonstrated in the several clinics.

These annual clinical meetings have become so popular that the plan of limiting the attendance and requiring advance registration was decided upon to prevent overcrowding. Such a plan has proven successful at the two previous meetings, as it insures accommodations at the

clinics for all who hold membership cards. It is evident at this time from the number of registrations already received at the office of the Secretary-General that the limit of membership for the Philadelphia meeting will be reached some time in advance of the meeting. The limit was fixed after making a careful survey of the operating amphitheatres, lecture rooms and laboratories of the several medical schools and hospitals as to their capacity for accommodating the visiting surgeons.

EVENING MEETING

On Monday evening at 8 o'clock in the ball room of the Bellevue-Stratford occurs the presidential meeting at which time the officers elected at the Boston meeting will be inaugurated. The presidential address will be delivered by Dr. Fred B. Lund of Boston the president elect. On each of the three following evenings there will be sessions of the section on general surgery in the ball room of the Bellevue-Stratford and on the same evenings separate meetings for the section on surgery of the eye ear nose and throat in another room in the same hotel. The program for these evening meetings appears on the following pages. These meetings open promptly at 8 o'clock and adjourn not later than 10.30.

On Friday evening in Witherspoon Hall at 8 o'clock there will be held a public meeting under the combined auspices of the Clinical Congress of Surgeons, the Philadelphia County Medical Society and the Department of Public Health and Charities of Philadelphia to which meeting the public at large is invited.

HEADQUARTERS

The Congress will utilize for its headquarters at the Bellevue Stratford the Ball Room, Clover Room, Red Room, Green Room and adjacent foyers and smaller rooms on the second floor of the hotel providing ample space for registration and ticket bureaus, bulletin board, etc., the ball room being used for the evening sessions.

The program of clinics and demonstrations for Monday will be bulletined on Saturday afternoon, and on each afternoon beginning on Monday the complete program for the next day's clinics will be posted on bulletin boards in headquarters. A printed program will be issued each morning.

SPECIAL TICKETS

Attendance at all clinics and demonstrations will be controlled by means of special tickets. The general rule will be that a member may have two tickets for each day, one for the morning and one for the afternoon clinics. For certain clinics where the accommodations are limited and the demand for tickets is heavy, it will be necessary to establish a rule whereby a member may have only one ticket for such clinic during the week. The number of tickets issued for any clinic or demonstration is limited to the capacity of the room in which the clinic or demonstration is to be given.

The use of special tickets has proven an efficient means of providing for the distribution of members among the several clinics and insures against overcrowding at any clinic. Special tickets will be issued each morning at 8 o'clock for the clinics and demonstrations to be held that day, a complete schedule of the day's clinics having been posted on the bulletin board on the afternoon of the preceding day, and a printed program distributed in the morning.

REDUCED RAILWAY FARES

The railways in the states east of the Mississippi River excepting the southeastern states south of the Ohio and Potomac Rivers and in the eastern portion of Canada have granted certain reductions in fares in selling round trip tickets to Philadelphia on account of the Clinical Congress of Surgeons. Round trip tickets will be sold at the rate of two cents per mile in each direction going and returning by the same route only and over which one way tickets are regularly sold. Tickets will be on sale from points within the territory specified on October 21st

22nd and 23rd with a general return limit to reach one's original starting point on or before midnight November 1st.

In particular these reduced rates will be in effect in the territory covered by the railway lines in the New England Passenger Association, Trunk Line Association, Central Passenger Association and Eastern Canadian Passenger Association. An application for the granting of the same reduction in fares by the lines in the southeastern states is now pending and probably will be acted upon favorably.

Members living in the states west of the Mississippi River and within the territory covered by the Western and Southwestern Passenger Association—that is west of Chicago and St. Louis—should purchase tickets to those gateway cities and then repurchase round-trip tickets to Philadelphia in order to avail themselves of the reduced fares.

The Baltimore and Ohio Railroad is prepared to offer members of the Congress from Chicago and the West attending the Philadelphia meeting special service on train leaving Chicago at 5:45 p.m. Saturday, October 1st, arriving Philadelphia at 5:10 Sunday evening and on train leaving Chicago at 10:45 Sunday morning arriving Philadelphia at 1 p.m. Monday. The Michigan Central Railroad in connection with the Lehigh Valley and the Philadelphia and Reading offers special service on its train leaving Chicago at 3:05 Sunday morning arriving Philadelphia at 9:15 Monday morning. From the Northwest the Great Northern Railway is making special arrangement for the benefit of members living along its lines while from the Southwest the Atchafalpa, Topeka and Santa Fe will likewise offer special facilities.

MEMBERSHIP—REGISTRATION FEE

The Constitution of the Congress provides that all subscribers to the official journal *SURGICAL Gynecology and Obstetrics* are members of the Congress and that such other legally qualified practitioners as are in good standing in their own communities may become members upon registering at an annual meeting. A registration fee is required of each member attending an annual meeting, there being no annual dues for members of the Congress. The registration fees provide funds to meet the expense of preparing for and conducting the annual meetings so that no financial burden is imposed upon members of the profession in the city entertaining the Congress.

PRELIMINARY CLINICAL PROGRAM

GENERAL SURGERY

Monday

CHARLES H. FRANKER — University Hospital — 0 to 1
 T. TURNER THOMAS — University Hospital — 3 to 4
 GEORGE G. ROSS — German Hospital — 0
 A. D. WHITTON — German Hospital — 10
 JOHN B. DEAYER — German Hospital — 10
 E. G. ALEXANDER — Episcopal Hospital — 10
 HARVEY C. DEAYER — Episcopal Hospital — 1 to 4
 W. WAYNE BARCOCK — Samaritan Hospital — 0 to 2
 NATHANIEL GREENBERG — Jewish Hospital — 0 to 1
 M. BEHREND — Jewish Hospital — 2 to 3
 KATH W. BALDWIN — Women's Hospital — 3
 LEVI J. HANCOCK — Methodist Episcopal Hospital — 10
 W. O. HEDMANN — Polyclinic Hospital — 10
 MORRIS BOOTH MILLER — Polyclinic Hospital — 10
 LEWIS H. ADLER — Polyclinic Hospital — 10
 JOHN B. ROBERTS — Polyclinic Hospital — 4 to 5
 FRANCIS T. STEWART — Jefferson Hospital — 4
 MELVIN M. FRANKLIN — St. Joseph's Hospital — 10 to 3
 W. HENRIK THOMAS — Medico-Chirurgical Hospital — 0 to 2
 JOHN A. BOONE — St. Mary's Hospital — 10

Tuesday

H. R. OWEN — Philadelphia General Hospital — 10
 H. R. LOUK — Philadelphia General Hospital — 10 to 4
 J. B. CARRETT — University Hospital — 0 to 10
 A. C. WOOD — University Hospital — 10 to 2
 W. WAYNE BARCOCK — Samaritan Hospital — 0 to 10
 LEON BRIDEMAN — Mt. Sinai Hospital — 10 to 2
 A. P. C. ARNHEIM — Episcopal Hospital — 0 to 10
 L. H. MULLER — Episcopal Hospital — 0 to 4
 NATHANIEL GREENBERG — Jewish Hospital — 0 to 10
 WILLIAM H. TELLER — Jewish Hospital — 0 to 5
 J. M. BALDWIN — Methodist Episcopal Hospital — 10 to 4
 SAMUEL McCLEARY III — Oncologic Hospital — 10 to 4
 CHARLES H. FRANKER — University Hospital — 0 to 1
 G. P. MUELLER — University Hospital — 1
 NATHANIEL GREENBERG — Jewish Hospital — 0 to 1
 WILLIAM H. TELLER — Jewish Hospital — 1 to 5
 W. B. VAN LEEUW — Hahnemann Hospital — 10
 JOHN SPEER — Polyclinic Hospital — 0 to 10
 JOHN H. GIBSON — Polyclinic Hospital — 1 to 1
 JOHN H. GIBSON — Jefferson Hospital — 10
 JAMES A. KELLY — St. Joseph's Hospital — 10 to 3
 J. T. C. JONES — St. Joseph's Hospital — 3 to 5
 A. C. WOOD — Howard Hospital — 10 to 30
 E. L. ELIASON — Howard Hospital — 10 to 30
 EMMET LAPLACE — Medico-Chirurgical Hospital — 0 to 1

JOSEPH H. ROSS — St. Mary's Hospital — 1
 D. ROMAN — St. Luke's Hospital — 10 to 5
 LEON BRIDEMAN — St. Agnes Hospital — 1 to 4
 GEORGE M. DOORANCE — St. Agnes Hospital — 0 to 1

Wednesday

EDWARD MARTIN — University Hospital — 0 to 10
 E. L. ELIASON — University Hospital — 1 to 10
 W. P. HEARN — Philadelphia General Hospital — 0
 CHARLES HANSON — Mt. Sinai Hospital — 1
 A. P. C. ARNHEIM — Episcopal Hospital — 0 to 10
 NATHANIEL GREENBERG — Jewish Hospital — 0 to 1
 M. BEHREND — Jewish Hospital — 1 to 3

W. B. VAN LEEUW and H. L. NORTROP — Hahnemann Hospital — 30
 FRANCIS SPRACUE — Woman's Hospital — 3
 LEVI J. HANCOCK — Methodist Episcopal Hospital — 10
 WILLIAM A. STEEL — Samaritan Hospital — 0 to 1
 JOHN A. BOONE — St. Joseph's Hospital — 0
 JOHN B. DEAYER — German Hospital — 1
 GEORGE P. MUELLER — Polyclinic Hospital — 10
 J. CHARLES DA COSTA — Jefferson Hospital — 10
 CHARLES F. NARRAU — St. Joseph's Hospital — 1 to 10

MELVIN M. FRANKLIN — St. Joseph's Hospital — 1
 EMMET LAPLACE — Medico-Chirurgical Hospital — 0 to 10
 ELLWOOD R. KIRK — St. Mary's Hospital — 1
 WILLIAM J. T. LOK — St. Agnes Hospital — 1 to 4

Thursday

T. TURNER THOMAS — Philadelphia General Hospital — 0 to 10
 W. W. YER BARCOCK — Samaritan Hospital — 0 to 1
 JOHN B. DEAYER — German Hospital — 10
 A. D. WHITTON — German Hospital — 0
 GEORGE G. ROSS — German Hospital — 0
 F. C. ALEXANDER — Episcopal Hospital — 10 to 1
 H. C. DEAYER — Episcopal Hospital — 1 to 4
 J. M. BALDWIN — Methodist Episcopal Hospital — 1
 NATHANIEL GREENBERG — Polyclinic Hospital — 0 to 1
 JOHN B. ROBERTS — Polyclinic Hospital — 10
 A. C. WOOD — Howard Hospital — 0 to 10
 FRANCIS T. STEWART — Jefferson Hospital — 1
 M. M. FRANKLIN — Jewish Hospital — 0 to 1
 W. H. TELLER — Jewish Hospital — 1 to 5
 JAMES A. KELLY — St. Joseph's Hospital — 10 to 3
 J. T. C. JONES — St. Joseph's Hospital — 3 to 5
 JAMES A. KELLY — St. Mary's Hospital — 10
 NATHANIEL GREENBERG — Mt. Sinai Hospital — 10 to 4
 LEON BRIDEMAN — St. Agnes Hospital — 1 to 4

Friday

JOHN B. DEAYER — University Hospital — 1
 DAMON B. PRITZER — University Hospital — 1
 LEVI J. HANCOCK — Methodist Episcopal Hospital — 10
 A. P. C. ARNHEIM — Episcopal Hospital — 0 to 10
 MAX S. ALLER — Mt. Sinai Hospital — 0 to 10
 LEON BRIDEMAN — Mt. Sinai Hospital — 10 to 4
 GEORGE P. MUELLER — St. Agnes Hospital — 10 to 4
 GEORGE M. DOORANCE — St. Agnes Hospital — 0 to 1

D. ROMAN — St. Luke's Hospital — 10
 W. W. YER BARCOCK — Samaritan Hospital — 0 to 1
 M. M. FRANKLIN — Jewish Hospital — 0 to 1
 WILLIAM H. TELLER and M. BEHREND — Jewish Hospital — 1 to 5
 KATH W. BALDWIN — Woman's Hospital — 3
 H. L. NORTROP and G. A. VAN LEEUW — Hahnemann Hospital — 30
 GEORGE G. ROSS — St. Agnes Hospital — 0
 SAMUEL McCLEARY III — Oncologic Hospital — 10 to 4
 JAMES A. KELLY — Polyclinic Hospital — 0 to 10
 GEORGE P. MUELLER and M. KIRK B. MILLER — Polyclinic Hospital — 10
 CHARLES F. NARRAU — Jefferson Hospital — 10

LEWIST LAPLACE—Medico-Chirurgical Hospital—9 to 12
 CHARLES F. NASSAU—St. Joseph's Hospital—9 to 1
 MELVIN M. FRANKLIN—St. Joseph's Hospital—9 to 1
 JOHN A. BOOKER—St. Mary's Hospital—9 to 1
 HARRY C. DEEVER—Woman's Medical College Hospital—

Saturday

W. WAYNE BABCOCK—Samaritan Hospital—9 to 12
 JOHN B. DEEVER—German Hospital—2
 LEVI J. HAMMOND—Methodist Episcopal Hospital—1
 THOMAS R. NELSON—Episcopal Hospital—1 to 3
 JOHN B. ROBERTS and JOHN H. J. PRON—Pol. Clinic Hospital—11 to 1

J. H. H. GIBSON—Jefferson Hospital—1
 JOHN J. GILBRIDE—Medico-Chirurgical Hospital—9 to 1

Days and Hours to be Observed

HARRY C. DEEVER—Kensington Hospital
 EDWARD B. HODGE—Presbyterian Hospital
 H. R. WHARTON—Presbyterian Hospital
 R. BERT C. LEE, M.D.—Pennsylvania Hospital
 J. H. H. GIBSON—Pennsylvania Hospital
 FRANCIS T. STEWART—Pennsylvania Hospital
 CHARLES F. MUELLER—Pennsylvania Hospital
 EDWARD B. HODGE—Pennsylvania Hospital
 FRANCIS O. ALLEN—Pennsylvania Hospital
 WALTER L. LILLIE—Pennsylvania Hospital

GYNECOLOGY AND OBSTETRICS

Monday

THEO A. ERCK—Gynecean Hospital—10 to
 BARTON COOKE HIRST and JOHN COOKE HIRST—Howard Hospital—11
 E. E. MONTGOMERY—Jefferson Hospital—11
 C. B. LONGNECKER—Oncologic Hospital—3
 F. C. HAMMOND—Samaritan Hospital—1 to 2
 JOHN M. FURTER—St. Agnes Hospital—9 to 12
 STEPHEN E. TRACY—Stetson Hospital—9 to 3
 WILLIAM D. CULLEN—West Philadelphia General Homoeopathic Hospital—
 LINDA STEWART COOGL—Woman's Hospital—9
 SARAH H. LOCKREY—Woman's Hospital—9
 JOHN G. CLARK and staff—University Hospital—9 to 12
 P. BROOKE BLAND—St. Joseph's Hospital—9 to 10
 F. HURST MAIER—St. Joseph's Hospital—9 to 10

Tuesday

GEORGE W. OUTERBRIDGE—Gynecean Hospital
 BROOKE M. AMSPACH—Gynecean Hospital
 D. B. JAMES and N. F. LANE—Hahnemann Hospital—3
 EDWARD P. DAVIS—Jefferson Hospital—11
 E. E. MONTGOMERY—Jefferson Hospital—1
 WILLIAM E. PARKER—Kensington Hospital—
 W. R. NICHOLSON—Methodist Episcopal Hospital—9
 RICHARD C. NORRIS—Methodist Episcopal Hospital—
 JOHN H. GIBSON and GEORGE E. SHOENMAKER—Presbyterian Hospital—12
 WILMER K. UREM—Samaritan Hospital—2 to 10
 JOHN A. MCGILVER—St. Agnes Hospital—9 to 10
 BROOKE M. AMSPACH—Stetson Hospital—9
 BARTON COOKE HIRST—University Hospital—9
 ALFRED HYNTER—Mt. Sinai Hospital—1
 SARAH H. LOCKREY—West Philadelphia Hospital—1
 Women—1 to 10
 ELIA W. GRIM—Woman Hospital—9
 MARI K. F. REMAD—Woman Hospital—
 ELIA B. F. PRITZ—Woman Medical College Hospital—1
 B. F. BAER—Pol. Clinic Hospital—1 to 4
 P. BROOKE BLAND—St. Joseph's Hospital—9 to 10
 F. HURST MAIER—St. Joseph's Hospital—10 to 12

Wednesday

THEO A. ERCK—Gynecean Hospital—1
 BARTON COOKE HIRST and JOHN COOKE HIRST—Howard Hospital—
 E. E. MONTGOMERY—Jefferson Hospital—
 E. P. DAVIS—Philadelphia General Hospital—1 to 4
 J. C. APPLGATE—Samaritan Hospital—1
 F. C. HAMMOND—Samaritan Hospital—1
 ALFRED HYNTER—St. Agnes Hospital—9 to 1

BROOKE M. AMSPACH—University Hospital—9 to 12
 CHARLES M. URE—Woman's Hospital—1
 WILLIAM R. NICHOLSON—Pol. Clinic Hospital—9 to 10

Thursday

C. R. F. W. OUTERBRIDGE—Cape Cod Hospital
 BRADLEY M. VAN PAUW—Cape Cod Hospital
 D. B. JAMES and N. F. LANE—Hahnemann Hospital—3
 JOHN M. FURTER—Jefferson Hospital—
 W. R. NICHOLSON—Methodist Episcopal Hospital—
 RICHARD C. NORRIS—Methodist Episcopal Hospital—
 C. B. LONGNECKER—Oncologic Hospital—3
 J. M. L. HIR—Philadelphia General Hospital—2 to 4
 J. H. GIBSON—Philadelphia General Hospital—Presbyterian Hospital—
 ALFRED HYNTER—Mt. Sinai Hospital—9 to 1
 WILLIAM E. PARKER—Kensington Hospital—2 to 1
 JOHN M. FURTER—St. Agnes Hospital—9 to 1
 STEPHEN E. TRACY—Stetson Hospital—9 to 1
 JOHN G. CLARK and staff—University Hospital—9
 WILLIAM D. CULLEN—West Philadelphia General Homoeopathic Hospital—1
 SARAH H. LOCKREY—West Philadelphia Hospital for Women—1
 MARI K. F. REMAD—Woman Hospital—9
 SARAH H. LOCKREY—Woman Hospital—9
 I. B. BAER and BLAND—St. Joseph's Hospital—9 to 1
 F. HURST MAIER—St. Joseph's Hospital—1
 L. B. VAILLANT—Woman Medical College Hospital—

Friday

THEO A. ERCK—Cape Cod Hospital—10 to 12
 BARTON COOKE HIRST and JOHN COOKE HIRST—Howard Hospital—
 WILLIAM E. PARKER—Kensington Hospital—
 J. C. HAMMOND—Samaritan Hospital—1 to 1
 JOHN A. MCGILVER—St. Vincent Hospital—
 M. L. C. E. DUB—Woman Hospital—9
 CHARLES F. MUELLER—Woman Hospital—
 JOHN A. MCGILVER—St. Agnes Hospital—9 to 1
 ALFRED HYNTER—St. Agnes Hospital—9 to 1

Saturday

P. BROOKE BLAND—Jefferson Hospital—1
 BARTON COOKE HIRST—University Hospital—9
 JOHN G. CLARK and staff—University Hospital—9 to 12
 WILMER K. UREM—Samaritan Hospital—1
 WILLIAM R. NICHOLSON—Pol. Clinic Hospital—9 to 1

Days to be Observed

C. R. F. W. OUTERBRIDGE—Medico-Chirurgical and Philadelphia
 L. L. CHARIT—Hospital—

ORTHOPEDIC SURGERY

Monday

- J T ROSS and staff — Methodist Episcopal Hospital — 4 to 5
 A. B. GILL — Episcopal Hospital — t 5
 JOSEPH M. SPILLER — St. Joseph Hospital — 3 to 4

Tuesday

- M. M. FRANKLIN — Philadelphia General Hospital — to 4
 J T ROSS and staff — Methodist Episcopal Hospital — 4 to 5
 H. A. WILSON and staff — Jefferson Hospital —
 W. J. TAYLOR and staff — Orthopedic Hospital — to
 J. P. MANN — Medico-Chirurgical Hospital — to 3.
 HARRY HUDSON and staff — Samaritan Hospital — t 4
 G. G. DAVIS and staff — University Hospital — to 3.

Wednesday

- G. G. DAVIS and staff — University Hospital — to 4
 J T ROSS and staff — Methodist Episcopal Hospital — 4 to 5
 A. B. GILL — Episcopal Hospital — 9 to
 JOSEPH M. SPILLER — St. Joseph Hospital — t 4.

Thursday

- H. A. WILSON and staff — Jefferson Hospital —
 G. C. DAVIS and staff — Orthopedic Hospital — to
 J. P. MANN — Medico-Chirurgical Hospital — to 3
 J. K. YOUNG and staff — Polyclinic Hospital — t 3
 G. C. DAVIS and staff — University Hospital — t 3

Friday

- J T ROSS and staff — Methodist Episcopal Hospital — 4 to 5
 G. C. DAVIS — Widener School — t 4
 G. C. DAVIS and staff — University Hospital — t 3
 J. K. YOUNG — Philadelphia General Hospital — to 4
 J T ROSS — Philadelphia General Hospital — t
 DR. J. MOORE — Hahnemann Hospital —
 JOSEPH M. SPILLER — St. Joseph Hospital — t 4.

Saturday

- A. P. C. VANDERBURG and staff — Orthopedic Hospital — 9 to
 H. A. WILSON and staff — Jefferson Hospital —

GENTTO-URINARY SURGERY

Monday

- H. R. LOUX and staff — Jefferson Hospital — to
 A. A. UZZE and Wm. H. BLACKBURN — German Hospital — 4 to 5

Tuesday

- E. H. SITER — Philadelphia Hospital — to 3.
 B. A. THOMAS — Polyclinic Hospital — t 3
 H. R. LOUX and staff — Jefferson Hospital — to

Wednesday

- H. M. CHRISTIAN — Medico-Chirurgical Hospital — t to t
 E. H. SITER and staff — University Hospital — t
 ELWOOD KIRBY — St. Mary's Hospital — to
 H. R. LOUX and staff — Jefferson Hospital — to

Thursday

- L. T. ABERCRAFT — Hahnemann Hospital — t
 L. T. ABERCRAFT — Women's Homeopathic Hospital — t 3
 H. R. LOUX — Jefferson Hospital — 9 to
 T. R. NEUMAN — University Hospital — t
 EDWARD M. WIT — University Hospital — 9 to 10.
 E. H. SITER and staff — University Hospital — t
 CHARLES HENCH — University Hospital — t 3

Friday

- L. T. ABERCRAFT — Women's Homeopathic Hospital — t 3
 B. A. THOMAS — Polyclinic Hospital — 2 to 3
 H. R. LOUX and staff — Jefferson Hospital — t
 A. A. UZZE and Wm. H. BLACKBURN — German Hospital — 4 to 5

ROENTGENOLOGY

Monday

- SIMON FELDSTEIN — Jewish Hospital — 9 to 10. Oblique and interesting fractures.
 A. G. MILLER — German Hospital — to
 GEORGE E. FRANK — Medico-Chirurgical Hospital — 30 to 3.30. Roentgen therapy in the treatment of deep-seated malignant disease.
 W. S. NEWCOMB — Presbyterian Hospital — to 3. Bone lesions. Sinus cases (in conjunction with Dr. Stauffer)

Tuesday

- DAVID R. BOWEN — Pennsylvania Hospital — to Fractures.
 FREDERICK C. HUTTON — 1438 N. 5th St — to Organic lesions of the stomach and duodenum.
 W. F. ALABRICK — Jefferson Hospital — t 3. Pyelocopy and pyelography.
 W. S. NEWCOMB — Presbyterian Hospital — to 3. Bone lesions. Sinus cases (in conjunction with Dr. Stauffer)

- A. G. MILLER — German Hospital — t
 GEORGE E. FRANK — Medico-Chirurgical Hospital — 30 and 3.30. Roentgen diagnosis of gastric and duodenal lesions. Lantern slide demonstration.

Wednesday

- W. F. ALABRICK — Jefferson Hospital — to 3. Fluorocopy of the gastro-intestinal tract.
 A. G. MILLER — German Hospital — t
 W. S. NEWCOMB — Presbyterian Hospital — t 3. Bone lesions. Sinus cases (in conjunction with Dr. Stauffer)
 GEORGE E. FRANK — Medico-Chirurgical Hospital — 30 to 3.30. Roentgen diagnosis of gall-stones.
 DAVID R. BOWEN — Pennsylvania Hospital — t Bone and joint diseases.
 M. K. FRANK — Stetson Hospital — Joint diseases and radiography of the urinary tract.
 JACOB W. FRANK — Hahnemann Hospital — 9

WILLIAM CAMPBELL POSEY — Wills Eye Hospital —
 P. N. K. SCHWENK — Wills Eye Hospital — 30.
 WILLIAM ZENTMAYER — Wills Eye Hospital — 2.
 MARY BOCHAMAN — Woman Hospital — 2.
 G. ORAM RING — Episcopal Hospital — 2.
 WENDELL REBER — Samaritan Hospital — 4 & 5.
 AARON BRAY — Lebanon Hospital —
 H. T. HANSELL — Philadelphia General Hospital —
 to 3.
 M. CLUKEY RADCLIFFE and J. M. GRISCOM — Presby-
 terian Hospital — 2.
 C. P. FRANKLIN — Stetson Hospital —
 G. E. DE SCHWENITZ and J. T. CARPENTER — University
 Hospital — 3.
 G. E. DE SCHWENITZ — University Hospital — 5.
 JOHN A. BROPHY — St. Agnes' Hospital — 1 to 4

Wednesday

WILLIAM T. SNOOKMAKER — German Hospital —
 CHARLES W. LEEVER and S. J. GITTLESON — Mt. Sinai
 Hospital — 3.
 L. WERTER FOX — Medico-Chirurgical Hospital —
 S. LEWIS ZIEGLER — Wills Eye Hospital —
 SAMUEL D. RUBLEY — Wills Eye Hospital — 2.
 M. CLUKEY RADCLIFFE — Wills Eye Hospital — 3.
 WILLIAM M. SWEET — Wills Eye Hospital —
 P. UL. PONTUS — Wills Eye Hospital —
 WENDELL REBER — Polyclinic Hospital — 1.
 WILLIAM ZENTMAYER — Polyclinic Hospital — 4.
 WILLIAM T. SNOOKMAKER — German Hospital —
 CHARLES J. JONES — St. Joseph's Hospital — 3.
 MIRIAM M. BUTT — Woman's Hospital — 2.
 H. G. GOLDENRO — Episcopal Hospital — 2.
 LOUIS LOVE — St. Mary's Hospital — 4.
 J. C. KNIPS — Jewish Hospital —
 JOHN W. CROOKY — Philadelphia General Hospital —
 to 5.
 EDWARD A. SWEETWAY — Philadelphia General Hospital —
 3 to 4.
 T. B. HOLLOWAY and H. M. LANGDON and CARL WILLIAMS
 — University Hospital — 5.

SURGERY OF THE EAR, NOSE AND THROAT

Monday

CHARLES P. GRAYSON — University Hospital —
 R. SKILLERN — Medico-Chirurgical Hospital —
 I. JONES — Philadelphia General Hospital — 2.
 MARGARET BUTLER — Woman Hospital —
 CURTIS EVER — Episcopal Hospital — 2.
 CARLE LEE FELT — Stetson Hospital —
 RALPH BUTLER — Polyclinic Hospital — 3 to 5

Tuesday

F. R. PACKARD — Pennsylvania Hospital — 2.
 D. B. KYLE — Jefferson Hospital — 2.
 RALPH BUTLER and JAMES A. BARNETT — German Hos-
 pital — 30.
 I. G. SHALLGROSS and H. S. WEAVER — Hahnemann
 Hospital — 30.
 R. SKILLERN — Medico-Chirurgical Hospital —
 FRED W. SMITH and OSCAR SEELEY — Hahnemann Hos-
 pital — 30.
 CHARLES C. BIDGENT — Episcopal Hospital —
 LAURA E. HUNT — Woman's Hospital —
 WALTER ROBERTS — Methodist Episcopal Hospital
 — 3.
 HUDSON MAADEN — Polyclinic Hospital —

Thursday

PHILIP H. MOORE — Methodist Episcopal Hospital — 4.
 JOHN A. BROPHY — St. Agnes' Hospital — 4.
 J. C. KNIPS — Jefferson Hospital — 3.
 WILLIAM T. SNOOKMAKER — Pennsylvania Hospital —
 GEORGE S. CRAMPTON — Pennsylvania Hospital — 2.
 WILLIAM CAMPBELL POSEY — Wills Eye Hospital — 2.
 P. N. K. SCHWENK — Wills Eye Hospital — 1 to 30.
 C. P. FRANKLIN — Stetson Hospital —
 WILLIAM ZENTMAYER — Wills Eye Hospital —
 MARY BOCHAMAN — Woman Hospital —
 FREDERICK KRAUSE — Episcopal Hospital — 2.
 AARON BRAY — Lebanon Hospital — 2.
 JAMES THORNTON and J. M. GRISCOM — Presbyterian
 Hospital — 2.
 G. E. DE SCHWENITZ and E. A. SWEET — University
 Hospital — 3.
 H. T. HANSELL — Philadelphia General Hospital — 1 to 3

Friday

H. T. HANSELL and WILLIAM M. SWEET — Jefferson
 Hospital — 45.
 S. LEWIS ZIEGLER — Wills Eye Hospital —
 SAMUEL D. RUBLEY — Wills Eye Hospital — 2.
 M. CLUKEY RADCLIFFE — Wills Eye Hospital — 3.
 P. UL. PONTUS — Wills Eye Hospital —
 E. A. SWEET and H. M. LANGDON — Children Hos-
 pital — 2.
 WENDELL REBER — Polyclinic Hospital —
 WILLIAM T. SNOOKMAKER — German Hospital —
 CHARLES J. JONES — St. Joseph's Hospital — 3.
 LOUIS LOVE — St. Mary's Hospital — 4.

Saturday

WILLIAM T. SNOOKMAKER — Pennsylvania Hospital — 2.
 GEORGE S. CRAMPTON — Pennsylvania Hospital —
 P. N. K. SCHWENK — Wills Eye Hospital — 30.
 WILLIAM ZENTMAYER — Wills Eye Hospital —
 AARON BRAY — Lebanon Hospital —
 WILLIAM CAMPBELL POSEY — Wills Eye Hospital —
 WILLIAM ZENTMAYER — Polyclinic Hospital — 3 to 4

LOUIS J. BUTLER and WILLIAM P. GRADY — St. Mary's
 Hospital — 3 to 5.
 BENJAMIN D. PARKER — St. Agnes' Hospital — 1 to 4

Wednesday

WALTER ROBERTS — Polyclinic Hospital —
 R. SKILLERN — Medico-Chirurgical Hospital —
 CARLE LEE FELT — Stetson Hospital —
 I. G. SHALLGROSS and H. S. WEAVER — Hahnemann
 Hospital — 2 to 30.
 FRED W. SMITH and OSCAR SEELEY — Hahnemann Hos-
 pital — 30.
 CURTIS EVER — Episcopal Hospital — 3.
 HENRY C. ORF — Oncologic Hospital — 2.
 D. BRADEN KYLE — Jefferson Hospital — 2.
 GEORGE M. MARSHALL — St. Joseph's Hospital — 2
 to
 MARGARET BUTLER — Woman Medical College Hospital —
 J. LEMUE D. VAN — St. Agnes' Hospital — 1 to 4

Thursday

I. G. SHALLGROSS and H. S. WEAVER — Hahnemann
 Hospital — 30.

FRED W. SMITH and OSCAR SEELEY — Halleman Hospital — 230
 CHARLES C. BIRD ET — Episcopal Hospital —
 WALTER FOSTERS — Methodist Episcopal Hospital —
 LAURA HUNT — Woman's Medical College Hospital —
 LOUIS J. BURNS and WILLIAM P. GRAY — M. —
 Hospital — 3 to 6
 D. BRADEN KYLE — Jefferson Hospital — 1
 A. W. WARE — Philadelphia Hospital — 1 to 2
 BENJAMIN D. PARRISH — Allen Hospital —

FRIDAY

SETH MACCUTEN SMITH — Jefferson Hospital — 1 to 2
 GEORGE M. COATES — Pennsylvania Hospital — 1
 I. G. SHALLOCKROSS and H. S. WEAVER — Halleman Hospital — 30

FRED W. SMITH and OSCAR SEELEY — Halleman Hospital —
 GLASCO J. PALMER — Halleman Hospital —
 CHARLES C. BIRD ET — Episcopal Hospital —
 MAX ARIST WARE — Woman's Medical College Hospital —
 I. G. SHALLOCKROSS and H. S. WEAVER — Halleman Hospital —
 D. BRADEN KYLE — Jefferson Hospital —
 A. W. WARE — Philadelphia Hospital —
 BENJAMIN D. PARRISH — Allen Hospital —

ALEXANDER RADFORD — University Hospital —
 CHARLES P. GARDNER — Memorial Hospital —

PRELIMINARY PROGRAM OF EVENING SESSIONS

GENERAL SURGICAL DIVISION — In the Ball Room of the Blue Tree Hotel

Presiding Officer: M. C.

Address of Welcome: ROBERT G. LECONTE, M.D., Philadelphia, Chairman, Committee on Arrangements
 CHARLES H. MAYO, M.D., Rochester, Minn., Address of Welcome, President
 Inauguration of President FRED BATES LUND, M.D., Boston, Vice-President J. P. R. HALL, M.D.,
 Winnipeg, and M. D. CLARK, M.D., New Orleans
 Presidential address by FRED BATES LUND, M.D., Boston, The Indications of Cholecystectomy
 J. M. T. FINNEY, M.D., Baltimore, Drainage of the Gall Bladder
 CHARLES H. MAYO, M.D., Rochester, Minn., Cholecystectomy vs. Cholecystectomy
 Discussion: J. C. DALLMAN, M.D., and JOHN B. DEWEY, M.D., Philadelphia

Tuesday October 1

DEAN LEWIS, M.D., Chicago, Fat and Fascia Transplantation
 Discussion: FRANCIS T. STEWART, M.D., Philadelphia
 J. BENTLEY SOUTER, M.D., New York City, Kidney Surgery
 WILLIAM F. BRAASCH, M.D., Rochester, Minn., Recent Methods in Kidney Diagnosis
 BRADFORD LEWIS, M.D., St. Louis, Diagnosis of Ureteral Diseases with Their Surgery
 J. T. GERAGHTY, M.D., Baltimore, Diseases of the Bladder
 EDWIN BEER, M.D., New York City, The Treatment of Benign Vesical Papilloma, Including Endo-
 vestic and Operative Methods
 Discussion: EDWARD MARTL, M.D., Philadelphia

Wednesday October 2

THOMAS CULLEN, M.B., Baltimore, Methods of Drainage Where Pelvic Intercostal Excess
 Discussion: E. E. MONTGOMERY, M.D., Philadelphia
 J. WHITRIDGE WILLIAMS, M.D., Baltimore, The Abuse of Cesarean Section
 Discussion: EDWARD P. DAVIS, M.D., Philadelphia
 GEORGE G. WARD, JR., M.D., New York City, Treatment of Intractable Vesico-vaginal Fistula
 Discussion: JOHN G. CLARK, M.D., Philadelphia
 C. JEFF MILLER, M.D., New Orleans, Surgical Treatment of Puerperal Peritonitis
 Discussion: BARTO C. HIRST, M.D., Philadelphia
 THOMAS J. WATKINS, M.D., Chicago, Cystocele and Prolapse
 Discussion: BROOKLYN M. ANPATHE, M.D., Philadelphia

Thursday October 26

- C. A. PORTER, M.D. Boston Surgery of the Peripheral Nerves
 Discussion CHARLES H. FRAZIER, M.D. Philadelphia, and JOHN H. GIBSON, M.D. Philadelphia.
- WILLY MEYER, M.D. New York City Cancer of the Breast.
- WILLIAM J. MAYO, M.D. Rochester, Minn. Cancer of the Stomach.
 Discussion FREDERICK W. PARHAM, M.D. New Orleans.
- GEORGE E. ARMSTRONG, M.D. Montreal, Canada Cancer of the Large Bowel
 Discussion STUART MCGUIRE, M.D. Richmond and E. WYLLIS ANDREWS, M.D. Chicago.
- JAMES T. CASE, M.D. Battle Creek, Mich. Treatment of Cancer by X-ray
 Discussion GEORGE E. FRAHLER, M.D. Philadelphia

DIVISION OF SURGICAL SPECIALTIES—At the Bellevue Stratford at 8 p.m.

Tuesday October 4

Symposium on Ophthalmic Surgery

- W. R. PARKER, M.D. Detroit The Present Status of Corneal and Taphing (Illiott's Operation) in Glaucoma.
 Discussion L. WEBSTER FOX, M.D. Philadelphia.
- ARNOLD KNAPP, M.D. New York City The Intracapsular Methods of the Extraction of Cataract Being a Review of the Various Procedures.
 Discussion HOWARD F. HANSELL, M.D. Philadelphia

Wednesday October 25

Symposium on Rhinological and Laryngological Surgery

- CHEVALIER JACKSON, M.D. Pittsburgh Some New Developments in Bronchoscopy
- R. CLYDE LYNN, M.D. New Orleans The Technique of Suspension in Bronchoscopy and Esophagoscopy
- HARRIS P. MOSHER, M.D. Boston The Webs and Pouches of the Upper End of the Esophagus
 Discussion D. BRADEN KYLE, M.D. GEORGE M. COATES, M.D. CURTIS C. EYES, M.D. Philadelphia.

PUBLIC MEETING Friday October 27 in Witherspoon Hall, at 8 p.m.

Under combined auspices of the Philadelphia County Medical Society, the Department of Public Health and Charities, and the Clinical Congress of Surgeons of North America.

- WATSON A. PRICK, M.D. Cleveland Care of the Teeth (Illustrated by lantern and cinematograph)
- JOSEPH C. BLOODGOOD, M.D. Baltimore Diagnosis of Cancer
- ROBERT W. LOVETT, M.D. Boston Description and Illustration of Curable Deformities and the Importance of Their Proper Treatment

CASE 14. No. 3 7709 Age 27 M. Erection of pus epigastric pain loss of weight, fainting spells. Pre-operative diagnosis duodenal ulcer. Operation, Oct. 26 either Dr F B Lund. Stomach and gall-bladder normal appendi infected and adherent. Appendectomy. Post-operative diagnosis, chronic appendicitis. Complications, none. Discharged Nov 8 wound healed.

CASE 5. No. 3 7037 Age 76 F Lump in left breast. Pre-operative diagnosis, carcinoma of breast. Operation, Oct. 26 either, Dr F B Lund amputation of breast dissection of axilla. Post-operative diagnosis same metastasis in lymph-nodes. Complications, none. Discharged Nov 9 wound healed.

CASE 6. N 3278 5. Age 26 F Tumor of abdomen. Pre-operative diagnosis, ovarian cyst. Operation, Oct. 6 either Dr F B Lund, removal of ovarian cyst. Post-operative diagnosis same. Complications, none. Discharged Nov condition excellent wound healed. Result, Aug. 9 6 scar solid some indefinite pelvic pain question of adhesions.

CASE 7. N 3 780 Age 3 M Comminuted fracture of femur. Operation, Oct. 28 either Dr F B Lund, application of bone band. Post-operative diagnosis, same. Complications, some post-operative shock for twenty-four hours. Discharged Nov 8 band healed fragments in excellent position using crutches. Result Aug. 9 6 patient walks with cane not examined.

CASE 8. N 3 7537 Age 39 M Fracture of both bones of leg. Operation, Oct. 28 either Dr F B Lund, application of bone band to tibia. Post-operative diagnosis, same. Complications, none. Discharged Nov 20 wound healed fracture in good position crutches. Result Mar. 9 6 band removed on account of slight swelling M y 9 6 union and practically perfect position.

CASE 9. No. 3 7031 Age 40 M N. vomiting and epigastric pain. Pre-operative diagnosis, carcinoma of stomach. Operation, Oct. 26 either Dr F B Lund, large nodular mass filling half of stomach inoperable exploratory laparotomy. Post-operative diagnosis, same. Complications, none. Discharged Nov 6 wound healed. Died about three months after operation.

CASE 20. No. 3 7556 Age 45 M Pain and swelling in epigastric erection of gas. Pre-operative diagnosis, epigastric hernia. Operation, Oct. 7 either D E H. Nichols, hernia repaired stomach normal Post-operative diagnosis same. Complications, none. Discharged Nov 24 wound healed. Result, Jul. 9 6 all until two or three months ago when he began to have pain after eating loss of appetite nausea mucus in stools. For week has been unable to work examination negative.

CASE. No. 3264 6. Age 30 M Oct. 9 suture of perforated ulcer of anterior wall of pylorus, gastro-enterotomy planned for Oct. 7. Pre-operative diagnosis, gastric ulcer. Operation, Oct. 27, either, Dr E H Nichols, posterior gastro-enterostomy. Complications, tonsillitis. Discharged Nov 8, relieved condition excellent. Result, July 9 6, on troubles except muscular rheumatism and some gastric pain about four weeks ago.

CASE. No. 3 7834. Age 4 M Tumor of breast 5 months' duration. Pre-operative diagnosis, carcinoma. Operation, Oct. 3 either Dr H A Lothrop, amputation of breast dissection of axilla. Post-operative diagnosis, same. Complications, none. Discharged Nov 5 wound healed.

CASE 3. No. 32046 Age 20 M Fracture of pelvis rupture of urethra. External urethrotomy. Oct. Operation, Oct. 3 either Dr H A Lothrop, catheter passed. Complications secondary urethrotomy on account of stricture, Nov Discharged Feb. 9 6 relieved. Result July 9 6 table to work on account

of pain and weakness I region of pubes. Urethral condition good X ray shows sound healing of pelvis not much deformity.

CASE 14. N 3 7835 Age 46 M Carbuncle on neck. Operation Oct. 3 gas Dr H A Lothrop infection. Discharged Nov 4 relieved wound granulating.

CASE 5. N 3 7007 Age 4 M Pain in right lower quadrant. Pre-operative diagnosis acute appendicitis. Operation, Oct. 8 either, Dr H A Lothrop appendectomy. Post-operative diagnosis same. Appendix perforated, with peritonitis. Complications, none. Discharged, Nov 6 relieved, with small scars. Result July 9 6 working since Jan cannot do heavy lifting examination shows weak place in scar; no hernia.

CASE 26. No. 3 7054 Age 43 F Pal in lower abdomen. Pre-operative diagnosis, probably appendicitis. Operation, Oct. 20 either Dr H A Lothrop drainage of pelvic abscess, appendix not found. Post-operative diagnosis same. Complications none. Discharged Nov. relieved small scars. Result J. 9 6 troubled with constipation since operation no other symptoms.

CASE 7. No. 3 704 Age 58 F Prolapsus. Operation Oct. 26 either Dr Frederick J Cotton, vaginal hysterectomy perineorrhaphy. Complications, recurrence of cystocele. Discharged Nov 20 general condition good curing pessary.

CASE 8. N 3 7 40 Age 44 M Bleeding from rectum with loss of eight. Pre-operative diagnosis, ? of carcinoma of sigmoid. Operation, Oct. 26 either, Dr Frederick J Cotton sigmoid thickened, on sign of carcinoma, proctectomy. Post-operative diagnosis, colitis. Complications, none. Discharged Nov 8 small scars. Under irrigation colitis with attendant mucus and blood entirely disappeared. On account of inconvenience from the occasional reopening of appendicostoma operation for removal of appendix was done Jul. 20 9 6.

CASE 29. N 3 78 Age 4 M Crab-foot. Operation Oct. 26 either Dr Frederick J Cotton, incision of plantar fascia, foot put up in plaster. Complications, none. Discharged Nov 6 wound healed crutches.

CASE 30. N 3 7750 Age 5 Acetia with jaundice. Pre-operative diagnosis, chrysis of liver. Operation, Oct. 26 either Dr Frederick J Cotton omentectomy. Complications, bronchopneumonia peritonitis. Discharged Oct. 30 dead. A tapeworm showed peritonitis and bronchopneumonia.

CASE 3. N 3 7031 Age 3 M Fracture of femur with overriding. Operation Oct. 8 either Dr Frederick J Cotton application of bone band. Complications none. Discharged Dec. 4 wound healed fragments in good position.

CASE 3. No. 3277 Age 49 F Fractured fibula, Cotton fracture. Operation Oct. 28 either Dr Frederick J Cotton reduction by manipulation plaster. Complications none. Discharged Nov 6 fragments in good position plaster and crutches. Result Aug. 9 6 no evident deformity no limp walking.

CASE 33. N 3 7483 Age 3 F Fracture of jaw. Operation Oct. 8 either Dr Frederick J Cotton, wiring of fragments. Complications, none. Discharged Nov. relieved, went to dentist. Result July 9 6 slight deformity excellent result.

CASE 34. N 327920 Age 50 F Fracture of neck of femur. Operation, Oct. 8 either Dr Frederick J Cotton, impaction of fragments. Complications, conjunctivitis mediastinal abscess. Discharged Dec. 6 general condition weak using crutches. Result, July 9 6 not as yet very useful result still uses crutch X ray shows solid union good position question whether union

is strictly boy patient feeble not able to make use of what function he has

CASE 35 No 3 7305 A 10 M Tra tur l both
bones of forearm poo position. Operation Oct the
Dr Frederick J Cotton open red cut Comph at n
sepsis with loss of position l fragment Discharg d
No 3 poo position to ret m later Re- b A
and 6 considerable scar w m limitatio l d al fl
and btl def rmity

Case 37 No 3 8034 Age 3 M Inguinal h 12
Operation Oct 29 ether Dr J Shun C Hubbard Fe
guson operation Complication none Discharge 1
Nov wound healed Result Au, / c w d schf
no moule.

amputat n C m p h u e s l i t t i t m
p t a t t m i d t h b f e r i t t D e
h a i D s w i f f d k l t J
I n t a t e s u d h e l l p a t t t f h a l t h
(4 O n t h r D W t C l f e t t t
O p e r a t P t i t i e r e p l i a
t t D h a i N 4 r i t d p a l t
J e A A N s A M H p e t i l p
t t O p e t O u t d t h D
H P n p i b e t t t t p e
h a d a n a d r e c l t p e J
h a i D p l l P j l
p a r t i p e r p e l l x
l a a i w a l l t h d a l b
t r i g e l
(4 N s A M T b l p a
d d m O p e u e t t a n D r H
B u r e l d l a n l a

CASE 38 N 3 7 3 Age F Salpangiti Of ra
wton Oct 25 ether Dr Da Id D Scannell salp of
tomy Post-operative diagno- l acute salp nrm (m
placations none Discharged Nov 13 relieved
bowed Result July 216 no pel tic mpt m has
been recently operated pon fo hernia f on l ble
size in the abdominal sca

CASE 39 No. 3 35f Age 9 M Acute app d t
Operation Oct. 5 ether D Da d D Scap ell 1 p
dectomy Complication no e. Discharged N
relieved wound healed. Result. N e of c of t

Case 20 No 3099. Ag 40 I Pre-operat diaz
nons gall-st nos. Operatio Oct 9 the D D d
D Scannell gall bladder normal appendix I
operatio diagnosis chronic appendix Cmpl
tions none Discharged Nov 13 rd ed und
heal D Result Ag 12 / rel of b t need t l
has occ local attack suggestive f gall bladder in a
repeated X ray examination negati

CASE 4: 327970 Age 24 F Appendicitis Op
tr Oct 28 thir D Da d D Scannell (pend t my
Post-operative diagnosis sam C mpl u ne
Discharged Nov 1 wou d healed lvs d Result
Aug 1 perfect.

probably tubercular. Operated Oct. 8 th. Discharge is chronic inflammatory evidence of tuberculosis (complications). Discharge not healed. Result 3 g. perfectly healed scar no evidences of tuberculosis.

ne evidences of bacterial infection
 (Case 43) Age 3 1/2 F P Per
 diagnosis appendicitis perilymphatic diaphragm
 was October 8 thru 10 (Diagnosed) Scannell
 detected Post-operative diagnosis hernia pipe diaphragm
 Completed m Discharged No clinical
 wound healed Result Age 1 1/2 no symptoms result
 perfect.

CV 44 N 3777 Age, F Pain right l w
quadra t. Operation Oct. 29 ther D Da d D
Scannell appendicit my Complicati n s D
harged N , relieved wound healed P ult Aug
perfect

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CASE 52, N 3 4 Age 18 Salpingitis with
pel catarrh, Oct annual drainage of pel base 2

Operation Oct. 7 ether Dr Frank H. Lahey salpingectomy. Complications, none. Discharged Nov. 3, against advice; profuse discharge from wound general condition excellent. Result, Aug., 9 6 letter states that there are no symptoms relative to operation but is anxious and has lost pounds.

CASE 60. No. 337803. Age 20 F. Colloid goiter. Operation Oct. 28 Dr Frank H. Lahey scopolamine morphine and novocaine, lobectomy partial. Post-operative diagnosis, simple adenoma. Complications, some difficulty in swallowing. Discharged, Oct. 3 wound healed. Result, Aug. 9 6 no prominence in neck pressure on swallowing still persists.

CASE 61. No. 337839. Age 55 M. Persistent sinus, chronic emphysema. Operation, Oct. 8 ether Dr Frank H. Lahey resection of ribs, decortication of lung. Complications, none. Discharged Nov. 3 sinus requires no dressing a day.

CASE 62. N. 337976. Age 3, M. Acute appendicitis. Operation, Oct. 7 ether Dr Halsey B. Loder appendectomy, appendix gangrenous. Post-operative diagnosis, same. Complications, none. Discharged Nov. 10. Itch small sinus. Result, July 19 6 patient says wound did not heal for 3 months now has no symptoms tumor about above broad parietal scar, no hernia.

CASE 63. No. 35033. Age 3 F. Pain in right lower quadrant, 9 days duration. Pre-operative diagnosis, appendicitis. Operation, Oct. 20, ether Dr Halsey B. Loder double salpingectomy. Post-operative diagnosis, salpingitis. Complications, none. Discharged Nov. 3 wound healed. Result July 9 6 reports by letter that she never felt better in her life and operation did her world of good.

CASE 64. No. 35535. Age 35 F. Varicose clots. Operation, Oct. 20 ether Dr Halsey B. Loder multiple ligations. Complications, bronchitis. Discharged Nov. 3 wound healed. Result, Jul. 9 6 little pain once while works in laundry examination shows ideal result.

Gynecological Service

CASE 65. No. 3705. Age 30. Backache. Pre-operative diagnosis, lacerated perineum. Operation Oct. 20 ether Dr Ernest B. Young D & C trachelorrhaphy anterior and posterior colporrhaphy. Complications, alveolar abscess. Discharged Nov. 10 dental wound healed. Last result, patient could not be traced.

CASE 66. No. 3744. Age 43. Lacerated cervix and perineum. Operation Oct. 21 ether Dr Ernest B. Young D & C, trachelorrhaphy anterior and posterior colporrhaphy. Complications, none. Discharged Nov. 8 relieved wound healed. Result Aug. 9 6 excellent result patient has enteropneumia and is undergoing change of life feel nervous.

CASE 67. No. 377. Age 30. Rectocele, ystocoele. Operation, Oct. 7 ether Dr Ernest B. Young D & C, anterior and posterior colporrhaphy. Nov. 9, central fixation and ligation of both tubes. Complications, none. Discharged Nov. 10 wound healed. Result Aug. 9 6 excellent anatomical result good perineal support no prolapse patient comfortable.

CASE 68. N. 338003. Age 43. Leucorrhoea. Pre-operative diagnosis, endocervicitis. Operation, Oct. 20 ether Dr Ernest B. Young D & C, cauterization of cervix with thermal cautery. Complications, none. Discharged Nov. 10 relieved. Result, July 9 6 still has discharge much improved as at time 1 some pain in right side pelvic examination entirely negative.

CASE 69. No. 3783. Age 60. Prolapsed uterus. Operation, Oct. 20 ether Dr Ernest B. Young anterior colporrhaphy perineorrhaphy ventral fixation. Com-

plications, none. Discharged Nov. 8 condition excellent. Last result, patient could not be traced.

CASE 70. N. 37780. Age 3. Salpingitis. Operation, Oct. 20 ether Dr Ernest B. Young left salpingectomy ventral suspension. Complications, none. Discharged Nov. 9, wound healed. Result, July 9 6 well until January when she fell the leg since then has had pain low in abdomen and metrorrhagia has lost pounds.

CASE 71. No. 3735. Age 40. Ovarian cyst. Operation Oct. 5 ether Dr Nathaniel R. Mason removal of large ovarian cyst appendectomy. Post-operative diagnosis, dermoid cyst of ovary. Complications, phlebitis of left leg. Discharged Nov. 5 condition excellent. Result, Jul. 9 6 does not feel ill since operation, mostly troubled with left leg some trouble with right and when 1 work left leg tender no signs of old phlebitis.

CASE 72. N. 37304. Age 7. Lacerated perineum. Operation Oct. 5 ether Dr Nathaniel R. Mason, D & C trachelorrhaphy colpoperineorrhaphy. Complications, none. Discharged Nov. 8 condition excellent.

CASE 73. N. 3765. Age 20. Backache for 4 years in previous operations without relief. Pre-operative diagnosis, lacerated perineum. Operation, Oct. 20 ether Dr Nathaniel R. Mason, D & C trachelorrhaphy colpoperineorrhaphy. Complications, none. Discharged Nov. 8 condition excellent. Result, July 9 6 she feels more pain in the back and hip than before operation. Examination reveals infiltration of right adnexa not present 1 time of operation.

CASE 74. N. 3786. Age 20. Menorrhagia. Pre-operative diagnosis, endometritis. Operation, Oct. 7 ether Dr Nathaniel R. Mason, curettage curettings negative. Complications, none. Discharged Nov. 10 relieved.

CASE 75. N. 17880. Age 10. Miscarriage 1 month. Operation, Oct. 7 ether Dr Nathaniel R. Mason curettage. Complications, none. Discharged Nov. 4, relieved.

CASE 76. N. 3767. Age 20. Bearing-down pain. Pre-operative diagnosis, retroversion. Operation Oct. 7 ether Dr Nathaniel R. Mason central fixation. Complications, none. Discharged Nov. 10 relieved wound healed. Result July 9 6 no symptoms however firm scar pelvis free.

CASE 77. N. 3786. Age 7. Miscarriage 13 months. Operation Oct. 21 ether Dr Nathaniel R. Mason curettage. Complications, none. Discharged Nov. 4, relieved.

CASE 78. N. 3796. Age 20. Miscarriage 1 month. Operation Oct. 8 ether Dr Nathaniel R. Mason, curettage. Complications, none. Discharged Nov. 6 relieved. Result Jul. 9 6 perfect relief general condition excellent no trouble in periods since operation.

CASE 79. N. 17864. Age 20. Endometritis. Operation Oct. 8 ether Dr Nathaniel R. Mason, D & C, trachelorrhaphy. Complications, none. Discharged Nov. 7 relieved. Result July 9 6 pain left and persisted all inter pregnancy in March miscarriage 15 or 6 weeks curettage perfectly efficient.

CASE 80. N. 37953. Age 20. Lacerated perineum. Operation Oct. 20 ether Dr Nathaniel R. Mason, D & C trachelorrhaphy posterior colpoperineorrhaphy. Complications, none. Discharged Nov. 3 wound healed.

CASE 81. N. 37783. Age 40. Lacerated cervix. Operation Oct. 20 ether Dr Nathaniel R. Mason D & C trachelorrhaphy. Complications, none. Discharged Nov. 10 relieved.

CASE 82. N. 376. Age 30. Lacerated cervix and perineum. Operation Oct. 5 ether Dr John T.

Williams, D & C trachelorrhaphy anterior and posterior colporrhaphy. Complications vomited for one week cause unknown. Discharged Nov 8 condition excellent. Result, July 916 condition good vomit when exerted.

CASE 83 No 327440 Age 23 Lacerated perineum. Operation Oct 25 either Dr John T Williams D & C trachelorrhaphy posterior colporrhaphy. Broke piece of needle, which could not be found left in perineum. Complications, no symptoms from broken needle. Discharged Nov 8 condition excellent. Result, July 916 condition good occasional pain in right side.

CASE 84 No 3865 Age 20 M. Carnage. Operation, Oct 26 Dr John T Williams urethra. Complications none. Discharged Nov 8 condition excellent. Result, August, 916 condition excellent. No further discharge. Months pregnant.

Aural Series

CASE 85 No 3865 Age 10 M. Chronic discharge from ear. Pre-operative diagnosis chronic otitis media and mastoiditis. Operation, Oct 26 either Dr Corn, A Leland simple excision. No radical operation done. Complications no lateral sinus thrombosis. No jugular tied. Discharged Nov 8 dead.

CASE 86 No 32850 Age 10 M. Chronic discharge from ear. Pre-operative diagnosis chronic otitis media and mastoiditis. Operation, Oct 27 either Dr J. M. Himes mastoidectomy. Complications none. Jugular tied and radical mastoidectomy. Discharged Nov 8 condition excellent. Result, July 916 ear dry and healed. Result, July 916 small scar. Hearing normal in both ears. Roughly.

Throat Series

Twenty-four operations for removal of tonsils and adenoids were performed by Dr Edg. M. Holmes. With complications and with satisfactory immediate result. Late results obtained in 6 cases. Throat in excellent condition in all. One case now has a discharging ear.

BOSTON DISPENSARY

Twenty-Five Cases

Surgical Series

CASE 1 No 10343 Age 4 M. Varicose vein. Operation Oct 27 cocaine. Dr Henry M. Chase ligation and excision of internal saphenous vein and below knee. Complications none. Late result, July 1916 entire freedom from symptoms of venous origin. Flat foot causes some discomfort.

CASE 2 No 10269 Age 30 M. Varicose vein. Operation Oct 27 cocaine and novocaine. Dr Henry M. Chase, ligation and excision groin and below knee. Complications died on seventh day suddenly with obvious cause. Embolism. No autopsy.

CASE 3 No 12470 Age 40 J. Varicose vein and ulcer. Operation Oct 9 cocaine and novocaine. Dr Hubert F. Day ligation and excision of internal saphenous vein and below knee and ulcer. Complications none. Above ulcer slightly infected. Late result, July 916 ulcer healed. No enlarged veins. No pain. Very kind.

CASE 4 No 103353 Age 54 J. Ingrowing toe nail. Operation, Oct 29 cocaine. Dr Oliver C. Tinkham excision of border of nail and matrix. Complications none. Late result Aug 1916 excellent.

CASE 5 No 9356 Age 25 J. Ingrowing toe nail. Operation Oct 2 cocaine. Dr Oliver C. Tinkham excision of border of nail and matrix. Complications none. Late result Jun 1916 excellent.

CASE 6 No 93360 Age 6 M. Ingrowing toe nail. Operation Oct 2 cocaine. Dr Oliver C. Tinkham excision of border of nail and matrix. Complications none. Late result Jul 1916 perfect result.

ham excision of border of nail and matrix. Complications none. Late result Jun 1916 excellent.

CASE 7 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 8 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 9 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 10 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 11 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 12 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 13 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 14 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 15 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 16 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 17 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 18 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 19 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 20 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 21 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 22 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 23 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 24 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 25 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 26 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 27 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 28 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

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CASE 30 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 31 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 32 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 33 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 34 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 35 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 36 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 37 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 38 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 39 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 40 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 41 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 42 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 43 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 44 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

CASE 45 No 9355 Age 4 M. Hernia. Operation Oct 2 either Dr J. M. Himes or Dr J. M. Himes.

Three cases were operated upon for deviated septum, one complicated by polyp and necrosis of turbinate. No post-operative complications. Late results obtained in 3 cases, anatomically excellent in both. In one case patient states sense of smell lost, in another headaches continue.

BOSTON LYING-IN HOSPITAL

One Case

CASE. No. 32003. Age 23. Pre-operative diagnosis, dystocia just prior to delivery. Operation, Oct. 5 either Dr. J. R. Torbert, cesarean section. Post-operative diagnosis, same. Complications, none. Discharged Nov. mother and baby well. Result, June, 9, 6, wound solid uterus in normal position no symptoms, baby well.

PETER BENT BRIGHAM HOSPITAL

Twenty-five Cases

CASE. N. 6702. Age 14 F. Came for relief of focal epilepsy and blindness. Pre-operative diagnosis, focal epilepsy (left arm). Operation, Oct. 5 either Dr. Harvey Cushing, osteoplastic exploration of right hemisphere. Post-operative diagnosis, same old meningio-encephalitis. Complications, none. Discharged Nov. 3 condition unchanged. Late result, June, 9, 6 condition unchanged.

CASE. No. 6557. Age 55 F. Came for relief of pain in, and enlargement of, abdomen. Pre-operative diagnosis, ovarian cyst. Operation, Oct. 5 either Dr. John Homans, exploratory laparotomy. Post-operative diagnosis, general carcinoma, large mass in left abdomen, carcinoma of omentum. Complications, none. Discharged Nov. 18 unimproved. Patient died Mar. 8, 9, 6 evidently of the disease found at operation. N. 6707.

CASE. No. 6855. Age 28 F. Came for relief of pain and frequency of micturition pain in right lumbar region. Pre-operative diagnosis, tuberculosis pyonephrosis. Operation, Oct. 5 either Dr. David Cheever right hemi-plectomy. Post-operative diagnosis, same. Complications, none. Discharged Nov. 9 improved. Lat. result, patient could not be traced.

CASE. No. 6035. Age 20 F. Came for relief of swelling in left groin 3 years duration. Pre-operative diagnosis, left inguinal hernia. Operation, Oct. 5, either Dr. David Cheever closure of direct inguinal hernia. Post-operative diagnosis, same. Complications, none. Discharged Nov. 8 relieved. Lat. result, patient could not be traced.

CASE. No. 6890. Age 35 F. Came for relief of lump in right breast. Operation, Oct. 5, 9, 5 for local removal of tumor reported benign at first but later proved to be malignant by microscopic examination. Pre-operative diagnosis, carcinoma of breast. Operation, Oct. 26, either Dr. David Cheever secondary excision of pectoral muscles, with dissection of ribs. Post-operative diagnosis, same. Complications, secondary skin graft 25 days after operation. Discharged Nov. 5 relieved. Lat. result, patient reports by letter that there is some swelling and weakness of arm local doctor report no evidence of return of the disease.

CASE. No. 6039. Age 38 M. Came for relief of difficulty in walking, dizziness, headache, and convulsions. Pre-operative diagnosis, tumor of right cerebral hemisphere. Operation, Oct. 26 Dr. Harvey Cushing right subtemporal decompression. Post-operative diagnosis, same. Complications, condition excellent until 7 p.m. when severe epileptiform attack occurred with death within a short time without regaining consciousness.

Autopsy endothelioma of the brain (right frontal lobe) probably operable subdural hemorrhage 1st of decompression wound beginning bronchopneumonia arteriosclerosis.

NOTE. On the morning of operation, the patient had Jacksonian seizure, involving his left hand no doubtless had the Congress not been present, this would have been brought to the attention of the operator and the operation postponed. Under these circumstances, subtemporal decompression was an incorrect measure, and he should have had an osteoplastic resection exposing the hand center which would have disclosed the tumor an easily accessible growth. It is the sort of accident that is more likely to occur under the pressure of work while entertaining large body of visitors, and is one of the reasons why I feel that on the whole, though these Congresses may be unproductive to the onlooker they often put the patient at disadvantage.—H. C.

CASE. N. 6090. Age 45 F. Came for relief of varicose veins and ulcer 20 years' duration umbilical hernia. Pre-operative diagnosis, same. Operation, Oct. 26, either Dr. John Homans, excision of internal saphenous vein by stripping no dissection excision of ulcer Nov. 6 repair of umbilical hernia under novocain Nov. 6, skin-graft for ulcer. Discharged relieved, Dec. 5, 9, 6. Lat. result, July, 9, 6 no swelling ulcer recently healed patient done her work has on bandages until recently good result.

CASE. N. 6048. Age 37 F. Came for relief of pain in lower right abdomen 3 days' duration. Pre-operative diagnosis, chronic salpingitis with exacerbation. Operation, Oct. 26 either Dr. John Homans, double salpingo-oophorectomy uterus not disturbed. Post-operative diagnosis, same. Complications, none. Discharged Nov. 9 relieved. Lat. result, June, 9, 6 (obtained by letter) patient considers herself improved but still suffers from the symptoms which brought her to the hospital.

CASE. N. 6033. Age 54, F. Came for relief of pain in upper right quadrant, of 8 years' duration. Pre-operative diagnosis, cholelithiasis and cholecystitis. Operation, Oct. 26 either Dr. David Cheever cholecystectomy excision of multiple pancreatic cysts. Post-operative diagnosis, same plus multiple cysts of pancreas. Complications, abundant discharge of clear fluid from wound no discoloration of skin. Discharged relieved, Dec. 6, 9, 6. Lat. result, July, 9, 6 wound finally healed and gives no discomfort feels well no symptoms.

CASE. N. 6814. Age 34 M. Came for relief of gastric distress and vomiting 4 weeks' duration. Pre-operative diagnosis, acute bleeding ulcer. Operation, Oct. 7 either Dr. John Homans, iliocecal pyroplasty section of indurated tissue removed. Post-operative diagnosis, suppurative gastritis induration of gastric wall no ulcer. Complications, none. Discharged Nov. 5 relieved. Lat. result, July, 9, 6 wound solid has gained 30 pounds occasional crampy pain in epigastrium and appendicular region no indigestion. Excellent result, but should have had appendix removed.

CASE. No. 603. Age 51. Came for relief of blindness. Pre-operative diagnosis, acromegaly 15th loss of vision. Operation, Oct. 7 either Dr. Harvey Cushing transphenoidal operation with partial removal of pituitary tumor. Post-operative diagnosis same struma of hypophysis. Complications, none. Discharged Nov. 9, relieved. Lat. result, July, 9, 6 marked subsidence of symptoms with improvement of vision.

CASE. No. 6838. Age 51. Came for relief of stomach trouble pain and hematemesis, three months duration. Pre-operative diagnosis, gastric ulcer or ca.

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Case

Thirty four Case
S & T S r u c

Case No 2063 Age 8 M Abdominal pain
Operative diagnosis ubacut appendicitis. Opera
Oct. 5 ether Dr John T Bottomley appendice
Post-operative diagnosis same Complications
Discharged 7 relieved Late result July 96
in lymph. odes

Case No 2059 Age 54 F Turno f breast
Operative diagnosis carcinoma of left b cast. Opera
Oct. 25 ether Dr John T Bottomley radical b cast
Post-operative diagnosis, same. Complica
none except f some edema of arm. Discharged
re relieved. Lat result died April 0 96 metas-
in lymph. odes

Thirty four Case
S & T S r u c

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Operative diagnosis carcinoma of left b cast. Opera
Oct. 25 ether Dr John T Bottomley radical b cast
Post-operative diagnosis, same. Complica
none except f some edema of arm. Discharged
re relieved. Lat result died April 0 96 metas-
in lymph. odes

CASE 3. No. 306. Age 35 F. Menorrhagia. Pre-operative diagnosis, myoma of uterus. Operation, Oct. 3, ether. Dr. John T. Bottomley supravaginal hysterectomy-omphorectomy. Post-operative diagnosis, same. Complications, peritonitis (see note). Discharged Oct. 30, dead.

CASE 4. N. 3064. Age M. Pain in right knee. Pre-operative diagnosis, sarcoma of right fibula. Operation, Oct. 5, ether. Dr. John T. Bottomley excision of upper end of fibula, external popliteal nerve cut. Post-operative diagnosis, same. Complications, none, except foot-drop. Discharged Dec. 1 to Nerve Department. Lat. result July 19, 6 wearing leg brace and doing well. Last report.

CASE 5. No. 046. Age 75 M. Urinary retention. Pre-operative diagnosis, hypertrophied prostate. Operation, Oct. 5 spinal anesthesia. Dr. Daniel F. Mahoney suprapubic prostatectomy (first stage of operation suprapubic cystostomy having been performed Oct. 6, 9, 5). Post-operative diagnosis, same. Complications, none. Discharged Nov. 26 relieved. Late result June, 9, 6 greatly improved, gets up once at night to urinate but only occasionally.

CASE 6. No. 3040. Age 25 M. Pre-operative diagnosis, inguinal hernia. Operation, Oct. 3, ether. Dr. Daniel F. Mahoney Bassini operation. Post-operative diagnosis, same. Complication, tuberculous meningitis. Discharged Nov. 3, dead.

CASE 7. No. 975. Age 45 F. Epigastric pain and vomiting. Pre-operative diagnosis, probable duodenal ulcer. Operation, Oct. 7, ether. Dr. John T. Bottomley posterior gastro-entostomy. Post-operative diagnosis, same. Complications, none. Discharged Nov. 12 relieved in excellent condition. Late result, unknown.

CASE 8. N. 3068. Age 60, F. Tumor of right breast. Pre-operative diagnosis, carcinoma. Operation, Oct. 7, ether. Dr. John T. Bottomley radical breast operation. Post-operative diagnosis, same. Complications, sepsis (see note). Discharged Nov. 3, dead.

CASE 9. No. 3047. Age 55 F. Abdominal tumor. Pre-operative diagnosis, ovarian cyst? Operation, Oct. 27, ether. Dr. John T. Bottomley removal of ovarian cyst. Post-operative diagnosis, ovarian cyst. Complications, sepsis (see note). Discharged Nov. 9, dead.

CASE 10. No. 3077. Age 40, M. Pre-operative diagnosis, incarcerated inguinal hernia. Operation, Oct. 20, ether repair of hernia (Andrews-Ferguson method). Post-operative diagnosis, same. Complications, local infection (see note). Discharged Dec. 3, relieved. Lat. result, June, 9, 6 wound healed, no impulse, condition good.

CASE 11. No. 3070. Age 50 M. Epigastric pain. Pre-operative diagnosis, cancer of stomach. Operation, Oct. 20, ether. Dr. John T. Bottomley posterior gastro-entostomy. Post-operative diagnosis, same. Complications, none. Discharged Nov. 30, relieved. Late result, died Apr. 7, 9, 6 had great relief for about two months.

CASE 12. N. 3060. M. Growth on tongue. Pre-operative diagnosis, cancer. Operation, Oct. 20, ether. Dr. John T. Bottomley dissection of both sides of neck (first stage) radical removal of growth. N. 24, 9, 5 (second stage). Post-operative diagnosis, same. Complications, none. Discharged Dec. 24, relieved. Lat. result, unknown.

Gynecological Service

CASE 1. No. 2446. Age 40. Came for relief of foul vaginal discharge. Pre-operative diagnosis, cancer of cervix. Operation, Oct. 6, gas and ether. Dr. Stephen Rushmore, panhysterectomy (radical) double salpingo-

omphorectomy. Post-operative diagnosis, same plus cholelithiasis. Complications, some breaking down of wound, serous discharge but no pus. Discharged Nov. 24, relieved. Late result, patient was admitted at another hospital Jan. 9, 6. X-ray examination suggested cancer of the stomach. V. operation. Death occurred in two weeks.

CASE 2. N. 2445. Age 37. Pain in pelvis and back. Pre-operative diagnosis, laceration of perineum, descensus of uterus with retroversion. Operation, Oct. 26, gas and ether. Dr. Stephen Rushmore, perineorrhaphy, appendectomy, shortening of ternal sacral ligaments, round ligament suspension of uterus (Kelly). Post-operative diagnosis, same. Complications, induration of incision but no breaking down. Discharged Nov. 3, relieved. Late result July 9, 6 anatomical result excellent, relieved of complaints on admission but complaints of occasional tenderness in incision.

CASE 3. No. 2444. Age 43. Menorrhagia. Pre-operative diagnosis, myoma of uterus, umbilical hernia. Operation, Oct. 6, gas and ether. Dr. Stephen Rushmore, supra-umbilical hysterectomy, double salpingo-omphorectomy, radical cure of hernia. Post-operative diagnosis, same. Complications, none. Discharged Nov. 10, relieved. Late result, July 19, 6 anatomical result excellent, never felt better in her life, hot flashes troublesome at first.

CASE 4. N. 2444. Age 43. Uterine hemorrhage. Pre-operative diagnosis, metropathy. Operation, Oct. 26, gas and ether. Dr. F. W. Johnson, panhysterectomy, double salpingo-omphorectomy. Post-operative diagnosis, multiple myomas. Complications, suppuration of abdominal wound. Discharged Dec. 8, relieved. Late result July 9, 6 anatomical result excellent, patient is well except for slight nervousness and mental depression, which is improving.

CASE 5. N. 2447. Age 53. Falling of womb. Pre-operative diagnosis, laceration of cervix and perineum, cystocele, rectocele and procidentia. Operation, Oct. 26, gas and ether. Dr. F. W. Johnson, D. & C. amputation of cervix, Watkins operation, perineorrhaphy. Post-operative diagnosis, same. Complications, none. Discharged Nov. 3, relieved. Lat. result July 9, 6 anatomical result excellent, well so far as pelvic symptoms are concerned, rheumatism of back and legs.

CASE 6. N. 2448. Age 50. Severe pain no right side of pelvis. Pre-operative diagnosis, procidentia. Operation, Oct. 26, gas and ether. Dr. L. E. Phaneuf, D. & C. amputation of cervix, resection of left ovary, appendectomy, suspension of uterus (Olshausen). Post-operative diagnosis, same. Complications, stitch abscess. Discharged Nov. 3, relieved. Late result, July 9, 6 anatomical result excellent, general health good, occasional pelvic discomfort, symptoms for which she came to the hospital are gone, she says.

CASE 7. N. 2445. Age 3. Pain in pelvis. Pre-operative diagnosis, laceration of cervix and perineum, chronic pelvic inflammation. Operation, Oct. 8, gas and ether. Dr. Stephen Rushmore, D. & C. perineorrhaphy, supravaginal hysterectomy (bi-section), double salpingo-omphorectomy. Post-operative diagnosis, same. Complications, none. Discharged Nov. 6, relieved. Late result, July 9, 6, excellent, patient feels perfectly well, occasional hot flashes which are growing less.

CASE 8. No. 2450. Age 45. Menorrhagia. Pre-operative diagnosis, metropathy. Operation, Oct. 26, gas and ether. Dr. F. W. Johnson, panhysterectomy, double salpingo-omphorectomy, appendectomy. Post-operative diagnosis, same. Complications, peritonitis. Discharged Nov. 6, dead.

CASE No. 634. Age 9 F. Pre-operative diagnosis, spleen infarct (infected). Operation, Oct. 5 either Dr. James S. Stone, excision of sac. Post-operative diagnosis, same. Complications infection of wound. Discharged Nov. 4, relieved. Result, Aug. 19 6 perfect scar solid, no paralysis, walks perfectly.

CASE 5. N. 6858. Age 4 F. Cervical adenitis, tuberculous. Operation, Oct. 5, either Dr. W. E. Ladd dissection of neck, removal of tonsils and adenoids. Post-operative diagnosis, same. Complications, none. Discharged Nov. 5 relieved. Result Aug. 9 6 inconspicuous scars in crease of neck, one or two small palpable glands.

CASE 4. No. 6859. Age months, F. Harelip and cleft palate. Operation, Oct. 5 either Dr. W. E. Ladd cheloplasty palat. to be operated on at year. Complications, none. Discharged Nov. 5 wound healed. Result, Aug. 9 6 very good result. Inconspicuous scar.

CASE 5. N. 6867. Age 4 M. Hypospadias. Operation, Oct. 5 either Dr. C. G. Mixer Beck operation. Complications, fistula. Site of old urethral opening. Discharged Nov. 8 small fistula. Result March, 916 secondary operation for closure of fistulous opening. Flaps sloughed. Result, Aug., 9 6 small stream of urine passes out of tip of glans through tunnel greater portion voided through fistulous opening.

CASE 6. N. 5883. Age 3 months, M. Angioma of forehead. Operation, Oct. 5 no anesthetic. Dr. T. W. Harmer application of liquid air. Discharged same day. Result, Aug. 9 6 scarcely noticeable scar.

CASE 7. No. 5888. Age 6 months, F. Ca. excruciating pain of parotid and ear. Operation, Oct. 5 either Dr. T. W. Harmer electrolysis. Discharged same day. Late result not known.

CASE 8. N. 585. Age 7 months. Cleft palate. Operation Oct. 26 either Dr. James S. Stone, staphylothyphary. Complications, none. Discharged Nov. 5 complete union. Result, Aug. 9 6 marbled gain in general health. Speech is reported indistinct but is doing well in school.

CASE 9. N. 6856. Age 7 M. Inguinal hernia. Operation Oct. 26 either Dr. C. G. Mixer repair of hernia (Ferguson). Complications none. Discharged Nov. 5 relieved. Result, Aug. 916 wound solid no recurrence no symptoms.

CASE N. 5624. Age F. Cleft palat. Operation, Oct. 27 either Dr. James S. Stone, staphylothyphary. Complications, chicken pox. Discharged N. 5 union of hard and anterior half soft palat. Lat. result, Aug. 9 6 partial success needs further operation on soft palat.

CASE 1. No. 6833. Age 3 F. Tumor of bladder. Operation, Oct. 7 either Dr. C. G. Mixer exploratory specimen removal, reported sarcoma. Secondary operation Nov. 7 partial extraperitoneal cystectomy. Result, Aug., 9 6 wound healed feels well urine normal cytoscopic shows no sign of recurrence.

CASE No. 6785. Age 4 F. Burn of arm. Operation, Oct. 26 either Dr. T. W. Harmer Thiersch graft. Complications, child fractures displaced grafts. Late result unknown.

CASE 3. No. 6873. Age 3 M. Inguinal hernia. Operation, Oct. 7 either Dr. T. W. Harmer repair of hernia (Ferguson). Complications, none. Discharged Nov. 4, wound healed. Result, Aug. 9 6 wound solid, no recurrence.

CASE 14. No. 687. Age 4, M. Inguinal hernia. Operation, Oct. 26 either Dr. James S. Stone. Repair of inguinal hernia (Ferguson). Complications none. Discharged Nov. 7 wound healed. Result, Aug. 9 6 perfect in every way.

CASE 5. No. 6855. Age month, M. Double harelip. Operation Oct. 8 either Dr. W. E. Ladd cheloplasty

Complications, none. Discharged relieved wound healed. Result, July 9 6 excellent.

CASE 6. N. 34. Age 3 F. Cleft palate. Operation, Oct. 8 either Dr. C. G. Mixer staphylothyphary. Complications, soft palate pulled away. Discharged relieved complete union of hard palate. Result, Aug. 19 6 hard palate united soft palate partially united there is cleft on quarter inch in length including the uvula pharyngeal fall.

CASE 7. N. 6876. Age months, F. Cutaneous angioma of arm. Operation Oct. 26 either Dr. T. W. Harmer excision. Complications, post-operative pyrexia. Discharged Nov. 4 wound healed. Result, July 9 6 no recurrence, scar soft.

CASE 8. No. 450. Age M. Cleft palat. Operation, Oct. 29 either Dr. James S. Stone staphylothyphary. Complications none. Discharged Nov. 9 union of hard and anterior half of soft palate. Result, Aug. 9 6 posterior half of soft palat. not united, needs further operation.

CASE 9. N. 6860. Age 3 F. Double inguinal hernia. Operation Oct. 29, either Dr. J. S. Stone repair of hernia. Complications none. Discharged Nov. 14, wounds healed. Result, Aug. 9 6 result excellent in every way.

CASE 20. No. 6870. Age 7 M. Cervical adenitis. Operation, Oct. 29 either Dr. W. E. Ladd, dissection of neck. Complications none. Discharged Nov. 5 wound healed. Result, Aug. 9 6, inconspicuous scar no palpable glands, general condition excellent.

CASE No. 6870. Age 8 F. Inguinal hernia. Operation Oct. 29 either Dr. C. G. Mixer repair of hernia (McEwen). Complications, none. Discharged relieved wound healed. Result, Aug. 9 6 wound solid perfect result.

Orthopedic Series

CASE N. 6835. Age 9, F. Contracture of tendo lacus (remors) (infantile paralysis). Operation, Oct. 5 either Dr. R. M. Lovett, double f. sclerotomy and myotomy of tendo lacus (remors). Complications none. Discharged relieved. Result July 9 6, legs can be hyperextended walking with braces and crutches, good result.

CASE 23. N. 6846. Age F. Knock-knee. Operation, Oct. 25 either Dr. Augustus Thorndill osteotomy (McEwen). Complications, none. Discharged relieved. Result, July 9 6 legs in good position walking without apparatus.

CASE 24. N. 686. Age 5 M. Torticollis, congenital. Operation Oct. 5 D. Augustus Thorndill, section of both heads of right sternocleid. Complications, none. Discharged, relieved. Result, July 1916 reports by letter lat. that child is doing well.

CASE 5. N. 6833. Age 5 F. Bow-legs. Operation, Oct. 5 either Dr. A. Ethelred, osteoclasis. Complications, none.

CASE 26. N. 6865. Age 6 M. Paralysis with contracture of tibialis anterior. Operation, Oct. 26 either Dr. R. M. Lovett, tendon transplantation anterior tibial to outer part of dorsum of foot. Complications, none. Discharged relieved. Result, June, 916 good anatomical result. Alls. 11th brace too early to record complete functional result.

CASE 27. No. 5547. Age 7 F. Infantile paralysis (hail-anke). Operation, Oct. 26 either Dr. Robert Souther astragaloctomy. Complications, none. Discharged relieved. Late result not known.

CASE 28. No. 6850. Age 4, F. Obstetrical paralysis. Operation, Oct. 26 either Dr. J. S. Stone Sever osteotomy of acromion division of subacromial tendon and portion of pectoralis major. Complications, none. Discharged

dilated cervix with erosion. Operation, Oct. 26 either Dr W P Graves, amputation of cervix supravaginal hysterectomy (first stage of operation) second stage done three weeks later. Post-operative diagnosis same. Complications, none. Discharged Dec 3. Results June, 96 anatomical condition good, slight elevation of perineum feels perfectly well no hot flashes.

CASE 5 N. 9857 Age 4. Came for relief of bearing-down pains, backache protrusion from vagina. Pre-operative diagnosis, wide distasia of recti muscles retroversion with prolapse rectocele uterol. Operation, Oct. 26 either Dr R. G. Wadsworth, dilatation and curettage trachelorrhaphy anterior colporrhaphy perineorrhaphy, appendectomy, posterior fixation of uterus approximation of recti muscles. Post-operative diagnosis same. Complications, considerable shock for 24 hours. Discharged Nov 5 relieved. Results June, 96 anatomical condition good slight recurrence of cystocele complete relief of backache some irritation of bladder to frequency of micturition.

CASE 6 N. 9866 Age 4. Came for relief of pain on sitting and discomfort from protrusion from vagina. Pre-operative diagnosis complete procidentia hypertriphed and elevated cervi. Operation Oct. 26 either Dr W P Graves, anterior colporrhaphy perineorrhaphy (second stage of operation. First stage had been done three weeks previous) Post-operative diagnosis same. Complications, none. Discharged Nov 5 relieved. Results June, 96 slight bulging at lower end of abdominal wound, results otherwise excellent, patient feels perfectly well no hot flashes.

CASE 7 N. 9855. Age 34. Came for the relief of dysmenorrhea and pain in left lower quadrant. Pre-operative diagnosis, retroversion. Operation Oct. 26 either Dr W P Graves, supravaginal hysterectomy appendectomy implantation of ovaries in situ. Post-operative diagnosis, retroversion pelvic inflammation. Complications, none. Discharged Nov 5 relieved. Results June, 96 anatomical condition excellent ovarian tissue palpable in abdominal wall no hot flashes.

CASE 8 N. 9867 Age 33. Came for relief of menorrhagia pain and tenderness in left lower quadrant. Operation three years previous for tubal pregnancy. Pre-operative diagnosis, supertuous uterus. Operation Oct. either Dr W P Graves supra vaginal hysterectomy lysis of adhesions. Post-operative diagnosis same. Complications, none. Discharged Nov 5 relieved. Results Dec 3. Used strong patient feels all.

CASE 9 N. 9868 Age 40. Came for relief of backache bearing-down pains frequency of micturition. Pre-operative diagnosis relaxation of vaginal outlet prolapse laceration of cervix. Operation Oct. 7 either Dr F A Pemberton, dilatation anterior colporrhaphy perineorrhaphy appendectomy fixation of round ligaments (Obhausen). Post-operative diagnosis same. Complications, none. Discharged Nov 6 relieved. Results June, 96 anatomical condition excellent patient much improved occasional discomfort in right lower pelvis.

CASE 10 N. 9874 Age 44. Came for relief of dysmenorrhea and sterility. Pre-operative diagnosis, fixation with retroversion. Operation, Oct. 7 either Dr F A Pemberton, dilatation, appendectomy, fixation of round ligaments (Obhausen). Post-operative diagnosis, same. Complications, none. Discharged Nov 5 relieved. Results May 96 anatomical condition excellent abdominal corrected dysmenorrhea much better.

CASE 11 N. 9875. Age 46. Came for relief of protrusion from vagina, left bearing-down pains. Pre-operative diagnosis, prolapse. Operation, Oct. 27 either Dr W P Graves, amputation of cervix anterior colporrhaphy perineorrhaphy fixation of round ligaments. Post-operative diagnosis same. Complications, none. Discharged Nov 5 relieved. Results June, 96 slight rectocele anatomical result otherwise excellent patient feels much better occasional backache few hot flashes.

CASE 12 N. 9860 Age 46. Came for the relief of menorrhagia. Pre-operative diagnosis, fibroid. Operation, Oct. either Dr W P Graves, supravaginal hysterectomy. Post-operative diagnosis, same. Complications none. Discharged Nov 5 relieved. Results June, 96 anatomical ondition excellent patient feels perfectly all.

CASE 13 N. 95. Age 45. Came for relief of backache profuse leucorrhoea. Pre-operative diagnosis, pelvic inflammation of mass in left side. Operation, Oct. either Dr F A Pemberton supravaginal hysterectomy. Post-operative diagnosis, same. Discharged Nov 5 relieved. Results June, 96 abdominal wound healed slight laceration of perineum and some cystocele patient feels perfectly well except for hot flashes once.

CASE 14 N. 985. Age 5. Came for relief of fertility and dysmenorrhea. Pre-operative diagnosis, infection. Operation Oct. 7, either Dr F A Pemberton dilatation of cervix fixation of round ligaments (Obhausen). Post-operative diagnosis, same. Discharged Nov 5 relieved. Results June, 96 anatomical condition excellent dysmenorrhea greatly relieved.

CASE 15 N. 9864. Age 4. Came for the relief of menorrhagia left pain to left lower quadrant. Pre-operative diagnosis, infection. Operation Oct. 7 either Dr W P Graves dilatation, appendectomy intra-abdominal steming of round ligaments (May). Post-operative diagnosis same. Complications, none. Discharged Nov 5 relieved. Results June, 96 anatomical condition excellent menorrhagia has ceased, patient complains of vaginal and abdominal discomfort no anatomical cause found.

CASE 16 N. 9865 Age 43. Came for relief of painful and bleeding hemorrhoids. Pre-operative diagnosis, lacerated perineum with recto hemorrhoids and fissure in ano. Operation, Oct. 8 either Dr F A Pemberton anterior colporrhaphy perineorrhaphy excision of rectal polyp and hemorrhoids. Post-operative diagnosis same. Complications none. Discharged Nov 5 relieved. Last result June 96 good result from vaginal operation patient much improved little bleeding from hemorrhoids when constipated.

CASE 17 N. 9869 Age 3. Came for relief of retroversion. Pre-operative diagnosis, retroversion-fibroid with prolapse. Operation Oct. 28, either Dr W P Graves, appendectomy fixation of round ligaments (Obhausen). Post-operative diagnosis, same. Complications, none. Discharged Nov 5 relieved. Last result unknown.

CASE 18 N. 9870 Age 53. Came for relief of pressure of tumor on bladder. Pre-operative diagnosis, large abdominal tumor probably fibroid. Operation Oct. 8 either Dr W P Graves supra vaginal hysterectomy excision of cyst. Post-operative diagnosis, large tumor with ovarian cyst (adenocarcinoma of ovary). Complications, none. Discharged Nov 5 relieved. Last result June, 96 anatomical result excellent patient feels perfectly well.

CASE 9. No 9871. Age 46. Came for relief of menorrhagia. Pre-operative diagnosis fibroids post-operative hernia. Operation Oct. 28 either Dr W. P. Graves supravaginal hysterectomy lysis of adhesions radical cure of hernia. Post-operative diagnosis, same pelvic inflammation. Complications none. Discharged Nov. 5. Late result, May 1906 of weakness in left inguinal region anatomical result otherwise excellent patient feels well.

CASE 20. No 9850. Age 38. Came for relief of incontinence of feces backache pain in right side. Pre-operative diagnosis complete laceration of perineum. Operation Oct. 8 either Dr W. P. Graves anterior colpo-rhaphy (Emmett's) perineorrhaphy complete laceration. Post-operative diagnosis, same. Complications none. Discharged Nov. 20 relieved complete control of gas and feces. Late result unknown.

CASE 1. No 9854. Age 37. Came for relief of constant dull ache in left lower quadrant irregular periods. Pre-operative diagnosis, retroversion sterility. Operation Oct. 8 either Dr F. A. Pemberton, right salpingo-oophorectomy fixation of round ligament (Olshausen's) pendency. Post-operative diagnosis retroversion tubal pregnancy. Complications none. Discharged Nov. 5 relieved. Late result June 9 anatomical condition excellent pregnant at month.

CASE 22. No 9855. Age 44. Came for relief of metrorrhagia pain in lower abdomen. Pre-operative diagnosis distasia of recti muscles probable fibroid. Operation Oct. 10 either Dr W. P. Graves supra-pubic hysterectomy pendency approximation of recti muscles. Post-operative diagnosis same hydrosalpinx. Complications none. Discharged Nov. 5 relieved. Late result unknown.

HOUSE OF THE GOOD SAMARITAN

Three Cases

CASE. No 20. Age 9 F. Infantile paralysis flexion of hip. Operation Oct. 18 either Dr Robert Sohier Soutter operation. Complications no diphtheria. Result Aug. 9 6 hips straight patient able to walk with apparatus to keep knees straight the muscles controlling the knee being paralyzed. Patient had not walked before operation for seven years.

CASE. No 2017. Age M. Congenital dislocation of hip. Operation Oct. 27 either Dr James W. Sever reduction of dislocation by Bradford machine. Result Aug. 9 6 hip in place but the leg stiff. Manipulation under ether. Ultimate results to be expected in about nine months from now.

CASE 3. No 2019. Age 8 M. Obstetrical paralysis of right arm. Operation Oct. 8 either Dr James W. Sever myotomy of subscapularis and pectoralis major. Results Aug. 1 9 6 excellent.

LONG ISLAND HOSPITAL

Nine Cases

CASE 1. No 35523. Age 65 F. Fibroid of uterus. Operation Oct. 26 either Dr J. H. Cunningham exploratory. Post-operative diagnosis carcinoma of the uterine body. Complications, none. Discharged Dec. 24 1916 metastatic carcinoma.

CASE. No 35688. Age 63 M. Painful and frequent micturition. Pre-operative diagnosis tumor in bladder hypertrophy of prostate. Operation Oct. 36 either Dr J. H. Cunningham Jr perineal section prostatectomy. Post-operative diagnosis tumor in bladder median prostatic bar. Complications, perineal fistula loss of

vesical control. Discharge 1 1/2 in 24 hours. Late result July 16 partial tumor.

CASE 4. No 3550. Age 48 M. Fibroid of uterus. Operation Oct. 26 either Dr J. H. Cunningham exploratory. Post-operative diagnosis adenoma. Complications slight. Discharge 1 1/2 in 24 hours. Late result July 16 perfect.

CASE 4. No 3500. Age 48 M. Fibroid of uterus. Operation Oct. 26 either Dr J. H. Cunningham perineal section. Complications, slight. Discharge 1 1/2 in 24 hours. Late result July 16 perfect.

CASE 5. No 3500. Age 48 M. Fibroid of uterus. Operation Oct. 26 either Dr J. H. Cunningham perineal section. Complications, slight. Discharge 1 1/2 in 24 hours. Late result July 16 perfect.

CASE 6. No 3500. Age 48 M. Fibroid of uterus. Operation Oct. 26 either Dr J. H. Cunningham perineal section. Complications, slight. Discharge 1 1/2 in 24 hours. Late result July 16 perfect.

CASE 7. No 3500. Age 48 M. Fibroid of uterus. Operation Oct. 26 either Dr J. H. Cunningham perineal section. Complications, slight. Discharge 1 1/2 in 24 hours. Late result July 16 perfect.

CASE 8. No 3500. Age 48 M. Fibroid of uterus. Operation Oct. 26 either Dr J. H. Cunningham perineal section. Complications, slight. Discharge 1 1/2 in 24 hours. Late result July 16 perfect.

CASE 9. No 3500. Age 48 M. Fibroid of uterus. Operation Oct. 26 either Dr J. H. Cunningham perineal section. Complications, slight. Discharge 1 1/2 in 24 hours. Late result July 16 perfect.

MASSACHUSETTS CHARITABLE EYE AND EAR INFIRMARY

Sixty nine Cases
Ophthalmic Service

CASE 1. No 4. Age 4 M. Piece of steel in eye ball. Operation Oct. 5 either Dr W. B. Lancaster removal of foreign body. Complication exudative choroiditis. Discharged Nov. 5 white eye date in childhood shadows projected on face. Result Aug. 1906 perfect.

CASE. No 428. Age 4 F. Tumor of right orbit. Operation Oct. 9 either Dr E. K. Ell. Extirpation of right lachrymal gland. Post-operative diagnosis degeneration of right lachrymal gland. No complications. Discharge Oct. 4.

CASE 3. No 4206. Age 44 M. Came for relief of ectropion of lower lid. Operation Oct. 5 either Dr E. K. Ell. Plastic operation. Snellen's vision N. Complications. Discharged Nov. 9. Result good.

CASE 4. No 408. Age M. Hypermature cataract left. Operation Oct. 5 cocaine. Dr P. H. Thompson combined traction of cataract. No complications. Diabetes. Discharged Nov. 5. Eye white and quiet vision in both glasses 20/40. End result Aug. 1906 eye white and quiet vision with glasses 20/40 +.

CASE 5. No 4220. Age 67 F. Cataract left vs. Operation Oct. 6 cocaine. Dr M. Les. St. John's intra-capsula extraction of cataract by Smith method, slight loss of vitreous. No complications. Discharge Nov. 17 vision 20/20 condition good. End result Aug. 9 6 good no double vision.

CASE 6 No. 4248 Age 3 F Came for relief of phthisis bulbi. Operation, Oct. 28 ether Dr H. B. Stevens, excision with insertion of glass ball. No complications. Discharged Nov 5 condition good.

CASE 7 No. 4306 Age 6 F Senile mature cataract, left. Operation, Oct. 29 cocaine, Dr P. H. Thompson, combined cataract extraction. Complication, slight iritis. Discharged Nov 7 slight injection present, some capsule in pupil vision 1th glass 20/30-40.

CASE 8 No. 4317 Age 75 F Senile mature cataract, left. Operation Oct. 28 holocaine, Dr F. E. Cheney, extraction of cataract with b. Irtetol Iridectomy. Complication, iritis. Discharged Nov 3 vision 20/30 condition not noted.

CASE 9 No. 4314 Age 51 F Staphylococcus of cornea, right. Operation, Oct. 29 ether Dr P. H. Thompson excision with insertion of glass ball. N complications. Discharged Nov condition good.

CASE 10 No. 4344 Age 64 F Senile mature cataract, left. Operation, Oct. 28 holocaine, Dr F. E. Cheney cataract extraction with buttonhole iridectomy. N complications. Discharged condition good. End-result, no date given, eye in good condition vision 1th glass 20/30.

CASE 11 No. 4377 Age 7 F Foreign body left eyeball. Operation Oct. 29 ether Dr W. B. Lancaster removal of foreign body with magnet. N complications. Discharged Nov some injection still vision 20/40.

CASE 12 No. 3988 Age 3 M Prolapsing exophthalmos arteriovenous aneurysm of orbit. Operation, Oct. 7 ether Dr Lincoln Davis, arterial operation several enlarged vessels tied 1 apex of orbit. Complication, whooping cough. Discharged Nov 20 relieved. Result June 19 exophthalmos practically gone no pulsation or bruit vision good not in good internal rotation limited excellent cosmetic result.

CASE 13 No. 4308 Age 13 F Buphthalmos of both eyes. Operation, Oct. 26 ether Dr C. S. Derby pars clementis, anterior chamber left. N complications. Discharged Nov eye white and q. 1 condition same. End result, July 9 6 unchanged condition not relieved.

CASE 14 No. 4355 Age 5 I I tri-ocular tumor right. Operation Oct. 20 novocaine Dr W. B. Lancaster excision. N complications. Post-operative diagnosis, melanotic sarcoma of choroid. Discharged Nov 1 sound healed condition good.

CASE 15 No. 424 Age 9 I Chronic dacryocystitis, left. Operation Oct. ether Dr P. S. Smyth, removal of tear sac. N complications. Discharged Nov 4 sound healed.

CASE 16 No. 4305 Age 75 F Immature cataract right. Operation, Oct. 7 cocaine Dr J. H. Verhoeff cataract extraction in capsule Turok method. Complication, capsule not removed required needling. Discharged Nov 9 somewhat injected good opening in capsule.

CASE 17 No. 3933 Age 40 M Perforating wound right eyeball. Operation Oct. 5 novocaine, Dr W. B. Lancaster excision, right eye. Considerable amount of pain during operation. N complications. Discharged Oct. 30 sound healed.

CASE 18 No. 4243 Age 63, M. Senile mature cataract left. Operation, Oct. 29 cocaine Dr P. H. Thompson, combined cataract extraction. N complications. Discharged Nov 13 eye white and quiet slight membrane in pupil vision 1th glass 20/40-.

CASE 19 No. 3809 Age 60, M. Secondary cataract, right. Operation, Oct. 13, cocaine, Dr P. H. Thompson, needling right. N complications. Discharged Nov 17 eye quiet; vision with glass 20/70.

CASE 20 No. 4246 Age 70 M. Immature cataract, right. Operation Oct. 5 cocaine Dr P. H. Thompson, combined cataract extraction loss of vitreous. N complications. Discharged Nov 20 pupil and media clear; eye white and quiet, vision with glass 20/70. End-result June 29 9 6 pupil drawn up some capsule in pupil vision with glass 20/40.

CASE 21 No. 4309 Age 65 F Immature cataract, right. Operation, Oct. 7, cocaine Dr F. H. Verhoeff combined cataract extraction. N complications. Discharged Nov 9 Condition good. End result condition good vision 1th glass 20/30.

CASE 22 No. 430 Age 53 M Chronic dacryocystitis left. Operation, Oct. 9 ether, Dr P. S. Smyth, excision of left lachrymal sac. N complications. Discharged Nov 1 sound off healed. End-result, no visible slight lachrymation good result.

CASE 23 No. 4337 Age 4 M Pterygium of both eyes. Operation, Oct. 29, cocaine, Dr E. K. Ellis, Mc. Reaoid transplantation operation, both eyes. N complications. Discharged Nov good result. End-result no recurrence of disease.

CASE 24 No. 430 Age 53 M Secondary cataract left. Operation Oct. 29, cocaine, Dr P. H. Thompson needling. N complications. Discharged Nov eye white and quiet. End-result pupil clear vision 1th glass 20/30.

CASE 25 No. 470 Age 53 M. Secondary cataract, right. Operation Oct. 30 cocaine, Dr P. H. Thompson, needling. N complications. Discharged Nov 20 eye white and quiet, vision with glass 20/30. End-result good opening in pupil vision 1th glass 20/40 vision reduced somewhat by small corneal scar.

CASE 26 No. 407 Age 7 M Senile mature cataract right. Operation Oct. 26, cocaine Dr Myers standard combined extraction loss of vitreous. Complications conjunctivitis from trichiasis. Discharged Nov condition good. End-result, clear opening in pupil vision with glass 20/30.

CASE 27 No. 4305 Age 45 F Secondary cataract, right eye. Operation Oct. 8 cocaine Dr P. H. Thompson needling. N complications. Discharged Oct. 30 slight injection good opening in pupil. End-result, good vision with glass 20/30.

CASE 28 No. 4308 Age 3 M Acute glaucoma, right eye following intracapsular extraction of congenital cataract. Operation Oct. 30 Dr Irtetol cataract knife pruned across anterior chamber and through the sclera allowing escape of aqueous. Complication piece of iris carried into incision. Discharged Nov condition good tension normal. End-result, patient has definite filtration scar, tension 8 mm. vision 1th glass 20/30.

CASE 29 No. 4304 Age 50, M Immature senile cataract, left eye. Operation Oct. 28 holocaine, Dr F. E. Cheney combined extraction. N complications. Discharged Nov condition good. End-result good opening in pupil vision with glass 20/30.

CASE 30 No. 433 Age 30 F Subacute glaucoma right eye. Operation, Oct. 5 ether Dr P. H. Thompson, iridectomy right. N complications. Discharged Nov 13 eye white and quiet vision 20/30. End-result, good small tag of iris quiet in wound tension 8 mm. vision with glass 20/70-.

CASE 31 No. 434 Age 67 M. Simple glaucoma, left, tension 70 mm. Operation, Oct. 27 cocaine, Dr De la Harrower Iridotomy. No complications. Discharged Oct. 3 improved. End-result, eye white and quiet, tension norm. filtration scar.

CASE 32 No. 4245 Age 60 M Immature cataract, left. Operation, Oct. 7 cocaine, Dr F. H. Verhoeff

CASE 4. No. 304503. Age 50, F. Rectum protrudes on straining. Pre-operative diagnosis, prolapse of rectum. Operation, Oct. 5, ether and novocaine. Dr. D. F. Jones, rectopexy cul-de-sac closed; rectum sutured to pelvic peritoneum. Complications, none. Discharged Nov. 1, relieved. Result, July 9, 6. Abdominal wound solid; sphincter relaxed, on straining mucosa protrudes about two inches, but no trouble as before but 1 less degree.

CASE 5. No. 304860. Age 51, M. Pain in right abdomen, year slight jaundice, liver enlarged. Echinoscoccus fixation test positive. Pre-operative diagnosis, echinoscoccus cyst of liver. Operation, Oct. 5, ether and novocaine. Dr. D. F. Jones, drainage of echinoscoccus cyst of liver. Post-operative diagnosis, same. Complications, none. Discharged Nov. 30, relieved. Result, July 9, 6. Man in bank discharging pump; patient looked sick, readmitted for further operation.

CASE 6. No. 304937. Age 47, F. Indigestion and epigastric pain for 7 years. Pre-operative diagnosis, gall-stones. Operation, Oct. 5, ether and novocaine. Dr. D. F. Jones, gall-bladder, stomach, pancreas, spleen and kidney seemed normal; appendectomy. Post-operative diagnosis, cholelithiasis, appendicitis. Complications, none. Discharged Nov. 9, relieved. Lat. result, June, 9, 6. Patient complained of exactly same symptoms as before operation: pain in abdomen, back, and tenderness in gall-bladder region. Recommended for re-admission. Letter from patient, Aug. 9, 6, "feeling better, too busy" to enter hospital at present.

CASE 7. N. 30487. Age 7, F. Vomiting and epigastric pain 3 months, loss of weight, tumor. Pre-operative diagnosis, carcinoma of stomach. Operation, Oct. 26, ether. Dr. C. A. Porter, partial gastrectomy, anterior gastro-enterostomy. Post-operative diagnosis, same. Complications, none. Discharged Nov. 30, relieved. Lat. result, July 9, 6, greatly improved after operation for 7 months; during last month pain and loss of weight. Re-admitted probably recurrence; mass also of lemon in right epigastrium attached to liver. Further operation not desired.

CASE 8. No. 30483. Age 64, F. Tumor of neck for 47 years. Pre-operative diagnosis, cystic goiter. Operation, Oct. 26, gas and oxygen and novocaine. Dr. G. W. W. Brewster, removal of right lobe of thyroid. Post-operative diagnosis, same. Complications, none. Discharged Nov. 5, relieved. Result, July 9, 6, better; feels much better; working; thinks operation a success.

CASE 9. N. 30488. Age 4, F. Pain in back. Irregular menstruation, bladder irritation. Pre-operative diagnosis, myoma of uterus. Operation, Oct. 26, gas and ether. Dr. G. W. W. Brewster, cyst of broad ligament removed; appendectomy. Post-operative diagnosis, cyst of left broad ligament. Complications, none. Discharged Nov. 9, relieved. Result, July 9, 6, wound solid; no complaints; working.

CASE 10. No. 304904. Age 50, M. Fracture of patella, 4 days duration. Pre-operative diagnosis, same. Operation, Oct. 26, ether. Dr. C. L. Scudder, open reduction and suture. Post-operative diagnosis, same. Complications, none. Discharged Nov. 14, relieved on crutches. Result, July, 9, 6, bony union; flexion to beyond right angle; extension normal, 2 times up on walking; has not worked since leaving hospital (painter).

CASE 11. N. 30480. Age 30, F. Pain in right upper quadrant, vomiting, tenderness. Pre-operative diagnosis, cholelithiasis. Operation, Oct. 26, ether. Dr. G. W. W. Brewster, cholecystectomy; gall-bladder filled with soft stones. Post-operative diagnosis, same. Complications, none. Discharged Nov. 18, relieved. Result, July 9, 6, wound solid; patient well in every respect, working.

CASE 12. No. 304753. Age 47, F. Indigestion for years, pain and vomiting for three weeks, hematemesis. Pre-operative diagnosis, cholelithiasis or duodenal ulcer. Operation, Oct. 26, ether. Dr. G. W. W. Brewster, posterior gastro-enterostomy with infolding for duodenal ulcer; appendectomy. Post-operative diagnosis, duodenal ulcer; gall-bladder normal. Complications, none. Discharged Nov. 4, relieved. Result, July 9, 6, wound solid; feels and looks well, has gained weight; no gastric symptoms.

CASE 13. N. 304878. Age 3, M. Pre-operative diagnosis, ununited fracture neck of femur. Operation, Oct. 5, ether. Dr. C. L. Scudder, bone-peg from tibia inserted into neck of femur; plaster. Post-operative diagnosis, same. Complications, none. Discharged Dec. 7, relieved on plaster. Lat. result, bone-peg accidentally fractured while changing plaster, Feb. 9, 6. Result, June, 9, 6, no plaster; position excellent; can flex thigh on trunk; motions somewhat restricted, not yet bearing full weight on thigh.

CASE 14. N. 304908. Age 4, F. Tumor of breast, 1 year's duration. Pre-operative diagnosis, fibrocystic disease. Operation, Oct. 7, gas and ether. Dr. G. W. W. Brewster, subcutaneous incision of breast. Post-operative diagnosis, pendulous fibroma. Complications, none. Discharged Nov. 5, relieved. Result, July 9, 6, patient reports by letter general health greatly improved.

CASE 15. N. 304905. Age 50, F. Indigestion and attacks of pain in right and left abdomen. Pre-operative diagnosis, gall-stones. Operation, Oct. 7, gas and ether. Dr. G. W. W. Brewster, cholecystectomy. Post-operative diagnosis, same. Complications, none. Discharged Nov. 9, relieved. Result, July 9, 6, wound solid; complains of same discomfort as before operation; heartburn, burp, flatulency.

CASE 16. N. 304950. Age 6, M. Frequent urination, one attack of retention. Pre-operative diagnosis, hypertrophied prostate. Operation, Oct. 7, spinal anesthesia, Dr. Franklin G. Balch, perineal prostatectomy. Post-operative diagnosis, same. Complications, none. Discharged Nov. 9, relieved. Result, July 9, 6, general condition excellent; voids solid; working; no urinary symptoms; urine clear; no residual.

CASE 17. N. 304945. Age 40, M. Pre-operative diagnosis, epigastric hernia. Operation, Oct. 7, ether. Dr. Franklin G. Balch, closure of epigastric hernia. Complications, none. Discharged Nov. 9, relieved. Result, July 9, 6, wound solid; no symptoms; working.

CASE 18. No. 304870. Age 50, F. Large abdominal tumor. Pre-operative diagnosis, ovarian cyst. Operation, Oct. 7, ether. Dr. Franklin G. Balch, cyst tapped and removed. Post-operative diagnosis, same. Complications, none. Discharged Nov. 8, relieved. Result, July 9, 6, better; reports health excellent.

CASE 19. N. 30498. Age 30, F. Nodule in breast 4 months duration. Pre-operative diagnosis, carcinoma of breast. Operation, Oct. 7, Dr. Samuel J. Miter, removal of breast and pectorals, and dissection of axilla, closure of wound by "cyclops" plastic. Post-operative diagnosis, same. Complications, none. Discharged Nov. 8, relieved. Result, July 9, 6, wound well healed, no evidences of recurrence; motions of arm free; excellent health; doing housework.

CASE 20. N. 304983. Age 30, F. Sharp pain in right upper abdomen for 2 weeks, jaundice. Pre-operative diagnosis, gall-stones. Operation, Oct. 7, ether. Dr. S. J. Miter, cholecystectomy. New-growth involving gall-bladder and head of pancreas. Post-operative diagnosis, adenocarcinoma of biliary passages. Complications, none. Discharged Nov. 9, unrelieved. Late result, letter states patient died about Dec. 20, 9, 5.

CASE 20 No 204971 Age 61 M Pain tenderness and muscle spasm over gall bladder region. Pre-operative diagnosis cholecystitis. Operation Oct. gas and ether Dr G W W Brewster cholecystostomy many ates removed Post-operative diagnosis same with hotel. Complications none Discharged Nov. 10. Relieved. Result July 1916 wound solid d t n excellent work slight epigastric discomfort at times.

CASE 21 No 204972 Age 5 F Abdominal tumor year lost 43 pounds in weight omitting Pre-operative diagnosis myoma of uterus. Operation Oct. ether Dr G W W Brewster supra-umbilical hysterectomy double salpingo-oophorectomy Post-operative diagnosis, cysto-adenoma of uterus and ovary Discharged Nov. 10. Relieved. Re-entered hospital Dec. 10 with gastric distress and vomiting Operation by Dr C W W Brewster abdominal extensive carcinoma at p l r u s. After gastro-enterostomy done Discharged July 1916. Relief of symptoms for a few weeks. Patient died March 13 1916.

CASE 22 No 204957 Age 42 F Umbilical tumor 10 years duration. Pre-operative diagnosis same. Operation Oct. 7 ether Dr Farrar Cobb lipectom closure of umbilical hernia (Mayo) Post-operative diagnosis same. Complications none. Discharged Nov. 9. Relieved. Result July 9 1916 wound solid feel well and strong work long.

CASE 23 No 204846 Age 45 M Ulcerated tumor of lip 3 years duration. Operation on lip 8 years pre-operative diagnosis, epithelioma. Operation Oct. 27 Dr Farrar Cobb removal of lower lip with cautery knife dissection of neck plastic. Complications none separation of wound edges. Discharged Nov. 10. Relieved. Later result re-entered Jan. 2 1916 small plastic operation on lip for deformity. Evidence of recurrence subsequent history not known.

CASE 24 No 204973 Age 4 F Abdominal pain and menorrhagia. Pre-operative diagnosis menometrorrhagia. Operation Oct. 2 ether Dr Farrar Cobb supra-umbilical hysterectomy double salpingo-oophorectomy Post-operative diagnosis, same. Complications pleurisy operation Oct. 28 to question if post-operative hemorrhage none found Post-operative psychosis Discharged November 3. Relieved. Result July 9 1916 wound solid some leucorrhoea feels strong able to do housework very nervous.

CASE 25 No 20496 Age 0 F Hematuria and pain for 1 month. Pre-operative diagnosis renal calculus. Operation, Oct. 7 ether Dr Lincoln Davis nephrectomy Post-operative diagnosis, pyelonephrosis with renal stone. Complications none. Discharged Nov. 5. Relieved. Result, July 9 1916 wound solid fine cloudy feel well no symptoms of any kind working 9 hours a day.

CASE 26 No 204947 Age 34 F Tumor of abdomen 6 months duration. Pre-operative diagnosis ovarian cyst. Operation, Oct. 7 ether Dr Lincoln Davis excision of ovarian cyst supra-umbilical hysterectomy double salpingo-oophorectomy Post-operative diagnosis, ovarian cyst and myoma of uterus. Complications none. Discharged Nov. 10. Relieved. Result July 9 1916 wound solid general condition excellent trouble at first with hot flashes, much improved now doing housework.

CASE 27 No 204849 Age 5 I Pain in right lower abdomen with tenderness for 8 weeks. Pre-operative diagnosis chronic appendicitis. Operation Oct. 7 ether Dr Farrar Cobb appendectomy Post-operative diagnosis same. Complications none. Discharged Nov. 1. Relieved. Late in July 9 1916 no pain digestion or mal wound solid health excellent.

CASE 28 No 204555 Age 0 M Right side of urine. Pre-operative diagnosis, hemiplegia. Operation Oct. 10 ether Dr Lincoln Davis Balh penicillin. Post-operative diagnosis, same. Discharged Nov. 10. Relieved. Result July 9 1916 wound solid feel well no symptoms of any kind working 9 hours a day.

CASE 29 No 204555 Age 0 M Right side of urine. Pre-operative diagnosis, hemiplegia. Operation Oct. 10 ether Dr Lincoln Davis Balh penicillin. Post-operative diagnosis, same. Discharged Nov. 10. Relieved. Result July 9 1916 wound solid feel well no symptoms of any kind working 9 hours a day.

CASE 30 No 204555 Age 0 M Right side of urine. Pre-operative diagnosis, hemiplegia. Operation Oct. 10 ether Dr Lincoln Davis Balh penicillin. Post-operative diagnosis, same. Discharged Nov. 10. Relieved. Result July 9 1916 wound solid feel well no symptoms of any kind working 9 hours a day.

CASE 31 No 204555 Age 0 M Right side of urine. Pre-operative diagnosis, hemiplegia. Operation Oct. 10 ether Dr Lincoln Davis Balh penicillin. Post-operative diagnosis, same. Discharged Nov. 10. Relieved. Result July 9 1916 wound solid feel well no symptoms of any kind working 9 hours a day.

CASE 32 No 204555 Age 0 M Indigestion and epigastric pain 4 years omitting emetic. Pre-operative diagnosis, indigestion. Operation Oct. 20 ether Dr C L Scudder pyloroplasty. Post-operative diagnosis, same. Discharged Nov. 10. Relieved. Result July 9 1916 wound solid feel well no symptoms of any kind working 9 hours a day.

CASE 33 No 2049 Age 45 M Pain in epigastrium in retracted tummy food tastes like porridge. Diagnosis, tumor of pylorus. Operation Oct. 20 ether Dr C L Scudder pyloroplasty. Post-operative diagnosis, same. Discharged Nov. 10. Relieved. Result July 9 1916 wound solid feel well no symptoms of any kind working 9 hours a day.

CASE 34 No 20490 Age 54 F Tumor of right side of neck slight exophthalmos and shortness of breath. Left side of the body emaciated months ago by Dr C A Port. Pre-operative diagnosis, collared goiter. Operation Nov. 10 ether Dr C A Port. Right lobe of thyroid removed. Post-operative diagnosis, same. Complications none. Discharged Nov. 10. Relieved. Result July 1916 excellent sea food well good result.

CASE 35 No 204936 Age 3 M Faral from fall ing accident 5 months ago. Pre-operative diagnosis, ruptured brachial plexus. Operation Oct. 7 ether Dr C A Port. Plevex fund and nerve suture. Post-operative diagnosis, same. Complications none. Discharged Nov. 9. Relieved. Result, July 9 1916 clavical united in return of function in nerves muscle laryngeal paralysis hyperaesthesia fulva and median supply.

CASE 37 No. 20403 Age 14, M Pre-operative diagnosis, undescended testicle. Operation, Oct. 29, Dr D. F. Jones, Bessie operation closure of hernia. Post-operative diagnosis, same, plus inguinal hernia. Complications, none. Discharged Nov. 3 relieved. Result, July 9 6 wound solid testicle well d. in scrotum, same size as left no subjective symptoms.

CASE 38 No. 20409 Age 3 M Old tuberculous of knee, ankylosis at 90°. Pre-operative diagnosis, same. Operation, Oct. 29 either Dr D. F. Jones amputation of knee-joint. Post-operative diagnosis, same. Complications, hematoma with separation of wound edges. Discharged Nov. 3 relieved. Lat. result, readmitted Nov. 3, 9 5 for hematoma and separation of flaps. Result, July 9 6 wound solid good stump wearing artificial leg; working in machine shop no pain.

CASE 39 No. 20434 Age 8 F Pal nausea diarrhoea loss of weight. Appendectomy and oophorectomy years ago. Pre-operative diagnosis, colitis. Operation, Oct. 29 gas and vygon, and novocaine, D. F. Jones lateral anastomosis of ileum to transverse colon. Post-operative diagnosis, tuberculosis of colon. Complications, none. Discharged Nov. 10 relieved. Result, July 9 6 wound solid creases palpable slight signs 1 lumps no pain, diarrhoea, or nausea, gained 44 pounds up to months ago since then has lost eight some cough for months.

CASE 40 No. 20454 Age 4 M Pre-operative diagnosis, peritonitis aemia. Operation, Oct. 29, either Dr B. H. Vincent, splenectomy. Post-operative diagnosis, same. Complications, transfused on second day after operation, wound broke open on fifth day resutured. Discharged Nov. 20, relieved. Result, July 9 6 wound solid improved steadily up to March, was 1 work when suddenly began to get worse transfused twice by Dr Vincent recently unable to work hard, 55% red count 750,000.

CASE 41 N 20493 Age 26 F Swelling of neck some palpitation, dyspnea and tremor pulse 80. Pre-operative diagnosis, colloid goiter slightly toxic. Operation, Oct. 29 gas and either D. C. A. Porter greater portion of both lobes removed. Complications, slight sepsis. Discharged Nov. 7 relieved. Went to Ireland letter received by sister July 9 6 (late patient is in excellent health).

CASE 42 N 20490 Age 75 M Papillary mass on tip and inside of cheek, years duration. Pre-operative diagnosis, epithelioma. Operation (lat. 29) either Dr R. B. Greenough excision of growth dissection of neck. Complications, none. Discharged Nov. 7 relieved. Letter from patient Aug. 9 6 states health excellent no recurrence month rather small.

CASE 43 N 20495 Age 1 M Oblique fracture of femur. Pre-operative diagnosis, same. Operation Oct. 29 either Dr R. B. Greenough, incision reduction, Parham band applied plaster. Complications, none. Discharged Nov. 24 relieved 1 plaster R admitted Feb. 9 6 band removed. Result, June 9 6 no shortening walked with slight limp moderate trophy of thigh still present. Aug. 9 6 seen b. Dr Greenough leg one-quarter inch longer than the other no limp no trophy of thigh does everything that other boys do.

CASE 44 No. 20496 Age 45 M Large tumor of buttock, 4 months. Pre-operative diagnosis, fibrosarcoma of buttock. Operation, Oct. 29 either Dr R. B. Greenough, tumor excised. Post-operative diagnosis, same. Complications, none. Discharged Nov. 9, relieved. Result March 9 6 died of recurrence: 4 Cooley treatments at Haddington Hospital.

CASE 45 N 20495. Age 47 F Lump in right breast for one year. Pre-operative diagnosis, carcinoma. Operation, Oct. 29, either Dr R. B. Greenough, dissection of axilla removal of breast 1th pectoralis. Post-operative diagnosis, same. Complications, granulating wound, erysipelas. Discharged Dec. 9 relieved. Thiersch graft Dec. 8. Result Aug. 10 6 letter from patient states that she is doing her own housework, can arm pretty well health good has gained 30 pounds examination negative.

Gentle-I is any Service

CASE 46 N 20498 Age 46 M Intermittent hematuria. Pre-operative diagnosis, papilloma of bladder. Operation Oct. 5 gas and oxygen, Dr Hugh Cabot, suprapubic cystotomy, excision of tumor. Post-operative diagnosis, same. Complications, none. Discharged Dec. 3, relieved. Result, July 9 6 wound solid, urine cloud, slight frequency and burning: cystoscopy shows no evidence of recurrence.

CASE 47 N 20499 Age 7 M Vesical calculus. Operation, Oct. 5 gas and vygon Dr Hugh Cabot, lithotomy. Post-operative diagnosis, same. Complications, none. Discharged Oct. 8 relieved. Result, July 9 6 daughter report patient too busy to come in "seems in good health."

CASE 48 N 20495 Age 68 M Frequent micturition and dribbling. Pre-operative diagnosis, hypertrophied prostate. Operation, Oct. 5 gas and oxygen, Dr R. F. O'Neil suprapubic prostatectomy. Complications, none. Discharged Nov. 7 relieved. Result, July 9 6 feels well gained weight was incontinent for some months, now has very slight incontinence, goes 1 night to 1 three times double inguinal hernia, urine cloudy residual 5 drams.

CASE 49 No. 20495 Age 20 M Swelling of testicle. Pre-operative diagnosis, testicular epididymitis. Operation Oct. 5 gas and oxygen, Dr J. D. Barney epididymo-vasectomy. Post-operative diagnosis, chronic inflammation. Complications, none. Discharged Oct. 20 relieved. Result, Aug. 9 6 wound healed testicle feels normal urine clear no local symptoms is being treated with tuberculin.

CASE 50 No. 20497 Age 48 F Pre-operative diagnosis, suppurative infection of left kidney: perinephric abscess. Operation, Oct. 28 Dr Hugh Cabot, nephrectomy. Post-operative diagnosis, perinephric abscess tuberculosis of kidney. Complications, infection of wound. Discharged Dec. 3 relieved. Result June 9 6 improvement in general health, pounds gain in weight wound still discharging no urinary symptoms.

CASE 51 N 20499 Age 8 M Frequent and painful micturition too pain in right flank. Pre-operative diagnosis, tuberculosis of right kidney. Operation Oct. 5 gas and vygon Dr R. F. O'Neil nephrectomy. Post-operative diagnosis, same. Complications, none. Discharged Nov. 9, relieved. Result, July 9 6 reports be letter gained 5 to 10 pounds wound solid urine clear apparently cured.

CASE 52 No. 20499 Age 29 M Pre-operative diagnosis, multiple calculi of right kidney. Operation Oct. 28 gas and oxygen, Dr E. L. Young, J. subcapsular nephrectomy. Post-operative diagnosis, calculus pyonephrosis. Complications, none. Discharged Nov. 16 relieved. Result, July 9 6 wound solid urine clear X-ray negative, feels well, working; some pain in other side.

CASE 53 N 20499 Age 66 M Retention of urine. Pre-operative diagnosis, obstructing prostatic. Operation Oct. 8 local anesthetic, Dr E. C. Crabtree, suprapubic puncture. Post-operative diagnosis, same.

Operation Nov 9, Dr O'Neill suprapubic prostatectomy. Unsuccessful convalescence except for low mental condition. Result, July 1916, report from Dr Kling urine still a little dirty but is improving no trouble with wound or with urination.

Othopedic Service

CASE 54 No 203840 Age 6 M Pain in left hip, 7 years duration. Pre-operative diagnosis by peritrophic arthritis of hip. Operation Oct 6 thru Dr F G Brackett, hip-joint opened, bony overgrowth and cartilage removed, plaster applied. Post-operative diagnosis same. Complications none. Discharged Jan 6 relieved in plaster. Result July 1916 patient in excellent health, wound healed, complete ankylosis of hip-joint, no pain or tenderness, some difficulty in sitting down.

CASE 55 No 01955 Age 25 F Pain in left knee for 11 years swelling and stiffness for 5 years. Pre-operative diagnosis tuberculosis of knee. Operation Oct. 26 ether, Dr E. G. Brackett, joint opened and in expected injection of Iodoform oil. Post-operative diagnosis same. Complications none. Discharged. Nos relieved. Late result, did well at first, Jan 9 discharged sinus advised to re-enter hospital patient refused and is being treated elsewhere.

CASE 56 No 203875 Age 3 M Pain swelling and flexion deformity of knee for 3 years. Arthrotomy and oil injection 2 1/2 years ago, now has instability of joint. Pre-operative diagnosis tuberculous. Operation Oct. 26 gas and ether Dr R B Osgood extension of knee joint fragments held by bone plates. Post-operative diagnosis same. Complications none. Discharged Nov. 19 relieved. Result, July 1916 knee ankylosed in good position, six weeks ago bone-plates removed, small granulating wounds on each side of knee, walks with cane, no pain.

CASE 57 No 203926 Age 33 M Occasional locking of joint, finally inability to move it. Pre-operative diagnosis, loose body in knee joint. Operation Oct. 9 ether, Dr E G Brackett joint opened by long incision splitting of patella, two loose bodies removed. Post-operative diagnosis, osteochondritis desiccans. Complications, tonsillitis. Discharged Nov. relieved in plaster. Result Jun. 1916 wound well healed patella movable flexion practically complete, knee is strong and causes little pain never locks as before operation good result.

CASE 58 No 203738 Age 3 F Limp since 2 years old. Pre-operative diagnosis congenital dislocation of hip. Operation Oct. 28 ether Dr E G Brackett open reduction of dislocation, suture and plaster applied. Post-operative diagnosis, same. Complications none. Discharged, Dec. 6 relieved in plaster. Result Jun. 1916 X-ray shows new acetabulum, limping motions fairly free, light limp and deformity definitely improved by operation.

CASE 59 No 204867 M Intermittent locking of knee. Pre-operative diagnosis dislocated semilunar cartilage. Operation Oct. 3 gas and ether Dr R B Osgood internal semilunar excised. Post-operative diagnosis, same. Complications none. Discharged relieved. Result, Aug. 5 1916 working knee as good as ever, no pain, limitation of motion or locking.

Throat Department

There were 13 operations for removal of tonsils and adenoids, performed by Drs. H A Barnes, J P Clark, D C Greene, J E W Herman, W F Knowles and Chandler R. Boies, under gas and ether anesthesia. The only complication was hemorrhage in one case controlled by suture of pillars. All were discharged relieved. Lat-

result obtained in cases which were satisfactory with the exception that in one case the patient was re-gelatinized. There was no acute abscess, infection or suppuration. There was no marked improvement in the treatment of 1 month without treatment.

There were 5 cases of deviated nasal septum operated upon by Dr Barnes, all under ether anesthesia. In one case the middle turbinate was removed. All cases discharged, relieved, late result known in cases not followed later.

On the 1st of March in past 11 months 11 patients under local anesthesia were performed by Dr C. C. Ten J. It is to be noted that Dr. C. C. Ten J.

Two cases of epiglottitis treated by Dr Barnes and Ten J. under local anesthesia were discharged relieved. Late result known in one case, no further trouble.

MASSACHUSETTS HOMEOPATHIC HOSPITAL

Eighty-four Cases

SALES

CASE No 80 Age 7 F Tumor left breast. Pre-operative diagnosis, carcinoma. Operation Oct. 5 ether Dr William I. Weselhoeft amputation of breast. Post-operative diagnosis same. Complications none. Discharged Nov. 6 relieved. Late result July 9, 1916 wound entirely healed, although an abscess formed after discharge from hospital, patient complains of more or less constant pain in the region of the scar.

CASE No 86 Age 60 M Indigestion, heart burn and milking of stools for years. Pre-operative diagnosis, gastric ulcer. Operation Oct. 5 ether Dr William I. Weselhoeft, esotomy with posterior gastrostomy. Post-operative diagnosis same. Complications, pneumonia. Discharged Nov. 10 dead. Autopsy acute bacterial pneumonia post-operative hypertrophy, chronic gastritis, bronchitis.

CASE No 868 Age 55 F Pain in right hypochondrium and vomiting. Pre-operative diagnosis, cholelithiasis. Operation Oct. 5 ether Dr Thomas E. Chandler, cholecystectomy. Tumor removed. Post-operative diagnosis same. Complications none. Discharged Nov. 5 relieved. Late result June 9, 1916 family physician reports patient relieved of all symptoms.

CASE No 911 Age 58 F Recurrent attacks of pain in lower right abdomen, flatulence and vomiting. Pre-operative diagnosis, appendicitis. Operation Oct. 25 ether Dr Thomas E. Chandler, appendectomy. Post-operative diagnosis same. Complications none. Discharged Nov. 3 relieved. Late result June 9, 1916 wound well gained, twenty pounds, mild attack of acute indigestion, relieved by peristaltic pump.

CASE No 830 Age 2 F Pain epigastrium, chills, fever and vomiting. Tenderness in right inguinal region. Pre-operative diagnosis, appendicitis complicating pregnancy. Operation Oct. 5 ether Dr H. H. Packard, appendectomy. Post-operative diagnosis same. Complications, mild suppuration of wound. Discharged Nov. 3 relieved. Late result could not be traced.

CASE No 826 Age 43 F Menorrhagia, abundant menses reaching umbilicus, frequent micturition and pressure symptoms. Pre-operative diagnosis, fibromyoma of uterus. Operation Oct. 6 gas and oxygen Dr Horace Packard, supra-umbilical hysterectomy. Post-operative diagnosis same. Complications none. Discharged Nov. 10 relieved. Late result could not be traced.

SURGERY GYNECOLOGY AND OBSTETRICS

CASE 7 No. 839 Age 37 F Menorrhagia mass protruding from vulva. Pre-operative diagnosis, fibroma of cervix uteri. Operation, Oct 26 either D J Emmens Briggs vaginal myomectomy. Patient four and one-half month pregnant. Post-operative diagnosis, none. Complications, none. Discharged Nov 5 health baby March 30 916 health perfect.

CASE 8 N 8745 Age 40 F Abdominal pain, right side sore on pressure. Pre-operative diagnosis, appendicitis. Operation Oct 26 either D J Emmens Briggs appendectomy. Post-operative diagnosis, none. Complications slight phlebitis. Discharged Nov 24, relieved. Late result, June 6 condition of wound excellent, troubled by swelling of right leg below of wound three months this difficulty now passing away and gives her but slight inconvenience.

CASE 9. No. 835 Age 55 F Inability to swallow 36 either D J Emmens Briggs dilatation of esophagus and insertion of cannula. Post-operative diagnosis, none. Complications, none. Discharged Dec 4 relieved necessary to introduce another cannula in 11 not healed from above.

CASE 10. No. 876 Age 35 F Frequent profuse hemorrhage during pregnancy. Pre-operative diagnosis, placenta previa. Operation, Oct 26 gas and oxygen, D Charles T Howard, cesarean section. Post-operative diagnosis, same. Complications, none. Discharged Nov 30, relieved. Late result, June 9 condition reported by family physician as perfect.

CASE 11 N 8600 Age 33 F Indefinite abdominal pain, irregular vomiting, constipation. Pre-operative diagnosis, gastro-enteroplegic, appendicitis. Operation, appendectomy. Post-operative diagnosis, same. Complications, none. Discharged Nov 7 relieved. Late result, June 9 6, good result as regards operation constipation and digestive symptoms much improved. Patient has developed, however, sacro-lumbar strain since going home.

CASE 12 N 8746 Age 9 F Pain attack of vomiting without relation to eating constipation. Pre-operative diagnosis, gastro-enteroplegic, nephropathy. Operation, Oct 25 either Dr Charles T Howard, Coffey operation, nephropathy. Post-operative diagnosis, same. Complications, none. Discharged Nov 7 relieved. Late result, June 9 6 stomach and kidney in position much improved in general condition still complaint of dragging sensation in her bowels.

CASE 13 N 8740 Age 3 M Sudden pain in right groin. Pre-operative diagnosis, right inguinal hernia. Operation, Oct 7 either Dr William F Woodcock closure of inguinal hernia. Post-operative diagnosis, same. Complications, none. Discharged Nov 4, relieved. Late result, July 9 6 wound sound no discharge or pain.

CASE 14 N 8505 Age 3 M Hematemesis two years' duration anemia. Pre-operative diagnosis, gastric ulcer. Operation, Oct 7 either Dr W F Woodcock posterior gastro-enterostomy. Post-operative

diagnosis, same. Complications, none. Discharged Nov 5, relieved. Late result, July 9 6 wound solid digestion much improved has gained weight.

CASE 15 N 8745 Age 36 M Right inguinal hernia. Operation Oct 26 either Dr W F Woodcock, Bassini operation of hernia. Post-operative diagnosis, same. Complications, none. Discharged Nov 5, relieved. Late result, July 9 6 wound strong no pain or discomfort never felt no strain.

CASE 16 N 8745 Age 9 F Pain in right side of abdomen on constipation. Pre-operative diagnosis, acute appendicitis. Operation, Oct 26 either D J Emmens Briggs appendectomy. Post-operative diagnosis, same. Complications, none. Discharged Nov 5, relieved. Late result, June 9 6 wound sound health much improved.

CASE 17 N 8745 Age 30 F Pain in right side of abdomen on constipation. Pre-operative diagnosis, right partial ileus. Operation, Oct 26 either D J Emmens Briggs double salpingectomy oophorectomy. Post-operative diagnosis, same. Complications, none. Discharged Nov 5, relieved. Late result, June 9 6 wound firm health

CASE 18 N 8745 Age 5 F Pain and soreness over bony surface and contusion. Pre-operative diagnosis, ventral hernia incarcerated. Operation, Oct 26 either D J Emmens Briggs repair of ventral hernia not lar deposits in abdomen. Post-operative diagnosis, same. Complications, none. Discharged Nov 5, relieved. Late result, June 9 6 patient gradually failed and died of carcinoma, Dec. 10

CASE 19 N 8745 Age 4 M Pain in lumbar region for three years chill and fever. Pre-operative diagnosis, nephropathy. Operation, Oct 26 either Dr J Emmens Briggs, nephropathy. Post-operative diagnosis, same. Complications, none. Discharged Nov 5, relieved. Late result, June 9 6 entire relieved of symptoms general health much improved.

CASE 20 N 8745 Age 41 F Constant pain in epigastrium, none on eating no vomiting no jaundice. Pre-operative diagnosis, adhesions. Operation, Oct 26 either D J Emmens Briggs, adhesions. Post-operative diagnosis, same. Complications, none. Discharged Nov 5, relieved. Late result, June 9 6 patient writes she is in

CASE 21 N 8745 Age 3 F Dysmenorrhea and menorrhagia. Pre-operative diagnosis, fibroid of uterus. Operation, Oct 26 either Dr George R. Southwick supravaginal hysterectomy. Post-operative diagnosis, same. Complications, none. Discharged Nov 5, relieved. Late result, June 9 6 patient writes she is in

CASE 22 N 8767 Age 35 F Profuse menstrual flow. Pre-operative diagnosis, lacerated perineum. Operation, Oct 26 either Dr George R. Southwick perineorrhaphy. Post-operative diagnosis, same. Complications, none. Discharged Nov 5, relieved. Late result, June 9 6 patient writes she is in

CASE 23 N 8745 Age 37 F Profuse menstrual flow. Pre-operative diagnosis, fibromyoma of uterus. Operation, Oct 26 either Dr George R. Southwick supravaginal hysterectomy. Post-operative diagnosis, same. Complications, none. Discharged Nov 5, relieved. Late result, June 9 6 patient writes she is feeling fine.

morphine ether D. Mary A. Smith D. & C. double salpingectomy appendectomy cholecystostomy excision of hemorrhoids. Post-operative diagnosis, same plus cholecystitis, with gall stones. Complication, infection of skin wound. Discharged Dec. 5 relieved. Result July 1916, abdominal wounds in good condition with posterior dysmenorrhea and backache, defecation painful.

CASE 3 No. 220 Age 27 F Abdominal pain Pre-operative diagnosis ovaritis fibrom. uterus possible appendicitis. Operation Oct. 26 scopolamine morphine ether Dr. Elizabeth Gray D. & C. left oophorectomy myomectomy appendectomy. Post-operative diagnosis same. Complications, none. Discharged Nov. 4 relieved. Patient could not be traced for late result.

CASE 4 No. Ag. 30 F Abdominal pain keloid in scar of previous operation. Pre-operative diagnosis endometritis ante flexion adhesions at splenic flexure keloid scar. Operation Oct. 26 scopolamine morphine only Dr. Emma B. Culbertson D. & C. insertion of Outebridge pessary, excision of keloid lysis of adhesions of splenic flexure of colon puncture of cysts. Post-operative diagnosis same. Complications none. Discharged Nov. 14 relieved. Result July 1916 wound solid. Patient now 4 months pregnant still complains of pain in region of splenic flexure.

CASE 5 No. 227 Age 30 F Pain in right de metrorrhagia sterility. Pre-operative diagnosis ovaritis adhesions of sigmoid. Operation, Oct. 7 scopolamine morphine, ether D. Emma B. Culbertson D. & C. left oophorectomy lysis of adhesions. Post-operative diagnosis same. Complications none. Discharged Nov. 4 relieved. Result August 96 uterus in good position—general health good.

CASE 6 No. 26 Age 47 F Proctitis compl. to Operati. N Oct. 7 scopolamine morphine ether D. Florence Duckering vaginal hysterectomy anterior colporrhaphy penneorrhaphy. Post-operative diagnosis same. Complications, none. Discharged Nov. 4 relieved. Result July 1916 good perineal body in recurrence of symptoms.

CASE 7 No. 31 Age 4 M Oblique fracture of femur Operation Oct. 7 ether Dr. Mary A. Smith reduction by manipulation splints and extension. Complications none. Discharged Nov. 9 relieved. Result July 96 perfect function no shortening no apparent abnormality. Ray shows union with some anterior deformity due to boxing.

CASE 8 No. 2 Age 9 F Ventral hernia chronic oophoritis chronic appendicitis. Operation Oct. 8 scopolamine-morphine, ether Dr. Mary A. Smith appendectomy right salpingo oophorectomy repair of hernia. Post-operative diagnosis same. Complications none. Discharged Nov. 14 relieved. Result Aug. 96 abdominal scar in good condition patient general health satisfactory ray sympt. none elevated.

CASE 9 No. 37 Age 59 F Polyp feces umbilical hernia. Operation Oct. 8 scopolamine morphine only Dr. Mary A. Smith repair of umbilical hernia removal of cervical polyp. Complications none. Discharged Nov. 3 relieved. Examined Aug. 96 no return of umbilical hernia very small scar no return of polyp no vaginal discharge. Very good result patient feeling very well since operation.

CASE No. 4 Age 28 F Backache and bearing down pain. Pre-operative diagnosis lacerated cervix and perineum ectoed. Operation Oct. 8 scopolamine morphine ether Dr. Florence W. D. Kering D. & C. amputation of cervix perineorrhaphy. Complications none. Discharged Nov. 16 relieved. Patient could not be traced for late result.

CASE No. 3 Age 35 F Flank pain Pre-operative diagnosis lacerated cervix and perineum. Operation Oct. 29 scopolamine morphine ether Dr. Mary A. Smith D. & C. amputation of cervix perineorrhaphy. Complications none. Discharged Nov. 16 relieved. Examined Aug. 96 no return of umbilical hernia very small scar no return of polyp no vaginal discharge. Very good result patient feeling very well since operation.

CASE No. 9 Age 34 F Complicated pregnancy. Operation Oct. 9 scopolamine morphine ether Dr. Emma B. Culbertson repair of lacerated cervix lysis of adhesions of sigmoid. Post-operative diagnosis same. Complications none. Discharged Nov. 4 relieved. Result July 1916 wound solid. Patient now 4 months pregnant still complains of pain in region of splenic flexure.

CASE No. 34 Age 60 F Pelvic pain Pre-operative diagnosis salpingitis. Operation Oct. 5 ether Dr. J. W. Lane salpingectomy. Post-operative diagnosis same. Complications none. Discharged Nov. 95 wound healed. Patient feeling very well since operation.

CASE No. 35 Age 35 F Pain in upper right quadrant. Pre-operative diagnosis gall stones. Operation Oct. 5 ether Dr. J. W. Lane cholecystectomy. Post-operative diagnosis same. Complications none. Discharged Nov. 18 wound healed. Patient feeling very well since operation.

CASE No. 3 Ag. 5 F Pelvic pain Pre-operative diagnosis salpingitis. Operation Oct. 5 ether Dr. J. W. Lane salpingectomy. Post-operative diagnosis same. Complications none. Discharged Nov. 5 wound healed. Patient feeling very well since operation.

CASE No. 224 Ag. 4 M Pain in back and hip. Pre-operative diagnosis biliary colic. Operation Oct. 5 ether Dr. J. W. Lane laparotomy. Post-operative diagnosis same. Complications none. Discharged Nov. 5 wound healed. Patient feeling very well since operation.

CASE No. 3 Ag. 5 F Pelvic pain Pre-operative diagnosis salpingitis. Operation Oct. 5 ether Dr. J. W. Lane salpingectomy. Post-operative diagnosis same. Complications none. Discharged Nov. 5 wound healed. Patient feeling very well since operation.

CASE No. 3 Ag. 5 F Pelvic pain Pre-operative diagnosis salpingitis. Operation Oct. 5 ether Dr. J. W. Lane salpingectomy. Post-operative diagnosis same. Complications none. Discharged Nov. 5 wound healed. Patient feeling very well since operation.

CASE No. 224 Ag. 4 M Pain in back and hip. Pre-operative diagnosis biliary colic. Operation Oct. 5 ether Dr. J. W. Lane laparotomy. Post-operative diagnosis same. Complications none. Discharged Nov. 5 wound healed. Patient feeling very well since operation.

SURGERY GYNECOLOGY AND OBSTETRICS

CASE 5 No. 343 Age 50 F Prolapse of uterus. Pre-operative diagnosis, partial prolapse of uterus. Operation Oct 5, ether D J W Lane Murphy suspension. Post-operative diagnosis, same. Complications, none. Discharged Nov 9 wound healed.

CASE 6 No. 365 Age 3 M Constant pain in lower right quadrant. Pre-operative diagnosis, chronic appendicitis. Operation Oct 5, ether Dr J W Lane, appendectomy. Post-operative diagnosis, same. Complications, none. Discharged Nov 8 wound healed.

CASE 7 N 30 Age 5 M Severe pain in gastric ulcer. Operation Oct 5 ether D J W Lane, pylorotomy and gastro-enterostomy. Post-operative diagnosis, carcinoma. Stomach and pancreas. Complications, shock. Died Oct 26 9 6

CASE 8 N 345 Age 40 M Rupture. Pre-operative diagnosis, right inguinal hernia. Operation Oct 5 ether D J W Lane Bassini. Post-operative diagnosis, same. Complications, none. Discharged Nov 14 wound healed, relieved.

CASE 9 No. 380 Age 10 F Pelvic pain. Pre-operative diagnosis, salpingitis. Operation Oct 5 ether D J W Lane salpingectomy. Post-operative diagnosis, same. Complications, none. Discharged Nov 14 wound healed, relieved.

CASE N 513 Age 50 F Prolapse of uterus. Pre-operative diagnosis, prolapse of uterus. Operation Oct 5 ether D L A Supple, Murphy suspension. Post-operative diagnosis, same. Complications, none. Discharged Nov 7 wound healed, relieved.

CASE N 2043 Age 4 F Unmenstruation. Pre-operative diagnosis, retroversion. Operation Oct 5 ether D L A Supple, Gilliam suspension. Post-operative diagnosis, same. Complications, none. Discharged Nov 7 wound healed, relieved.

CASE No. 2059 Age 5 F Acute abdominal pain. Pre-operative diagnosis, right appendicitis. Operation Oct 5 ether D L A Supple, appendectomy. Post-operative diagnosis, same. Discharged Nov 7 wound healed, relieved.

CASE 3 N 204 Age 5 M Constant abdominal pain. Pre-operative diagnosis, chronic appendicitis. Operation Oct 5 ether D L A Supple, appendectomy. Post-operative diagnosis, same. Complications, none. Discharged Nov 7 wound healed, relieved.

CASE 12 N 2057 Age 4 F Persistent vaginal discharge. Pre-operative diagnosis, endometritis. Operation Oct 5 ether D L A Supple, dilatation and curettage. Post-operative diagnosis, same. Complications, none. Discharged Nov 7 wound healed, relieved.

CASE 5 N 2058 Age 31 Pain and swelling in right leg. Pre-operative diagnosis, osteomyelitis of fibula.

Operation Oct 5 ether Dr L. A. Supple, curettage. Post-operative diagnosis, same. Complications, none. Discharged Nov 5 wound draining, relieved.

CASE 6 N 2040 Age 5 F Prolapse of uterus. Pre-operative diagnosis, complete prolapse of uterus. Operation Oct 5 ether D L A Supple, Waitlist suspension. Post-operative diagnosis, same. Complications, none. Discharged Nov 20 wound healed, relieved.

CASE 7 N 206 Age 3 Stiff knee joint. Pre-operative diagnosis, ankylosis of knee joint. Operation Oct 5 ether D Thoma, F Brodbeck resection of knee joint. Post-operative diagnosis, same. Complications, none. Discharged Dec 4 relieved.

CASE 8 N 208 Age 5 F Knock-knee. Pre-operative diagnosis, double genu varum. Operation Oct 5 ether D Thoma, I iliofemoral osteotomy of ilia. Post-operative diagnosis, same. Complications, none. Discharged Dec 4 wound healed, relieved.

Urological Service

CASE 9 N 200 Age 35 M Previous operation for removal of stone from right kidney pelvis Nov 1 9 4. Pre-operative diagnosis, recurrent stone in right kidney pelvis. Operation Oct 5 ether Dr A L Chitt, pyelolithotomy. Discharged Dec 30 relieved. Feb 3 9 6 re-entered hospital on account of urinary fistula in skin.

Operation, Mar 4 9 6 nephrectomy. Operation long and difficult followed by shock. Transfusion good recovery. Discharged Mar 9 6 well. Result, July 9 6 patient without symptoms, urine clear.

CASE 20 N 95 Age 60 M Retention of urine. Pre-operative diagnosis, prostatic obstruction. renal insufficiency. Sept 30 suprapubic cystostomy. renal local anesthesia. Operation Oct 27 ether Dr A L Chitt, suprapubic prostatectomy. Complications, infection following suprapubic salt infusion. Patient failed and died on Nov 5 9 6 N tops.

CASE N 70 Age 5 M Pre-operative diagnosis, acute fibrous contraction of bladder outlet. Operation Oct 20 ether Dr A L Chitt, perineal prostatectomy. Complications, none. Discharged Dec 10 relieved. R ported early in 9 6 that he was without symptoms.

CASE N 53 Age 64 M Retention of urine. Preliminary suprapubic cystostomy under novocaine anesthesia Oct 9 Operation Oct 20 ether D A L Chitt, suprapubic prostatectomy. Complications, none. Discharged in three weeks in good condition.

CASE N 843 Age 37 M Distention of bladder with incontinence. Pre-operative diagnosis, structure of urethra. Operation Oct 8 ether Dr Arthur H (Crosbie) relieved. Result, Mar 6 9 6 N 23 wound healed easily to bladder.

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EDITORIAL ANNOUNCEMENT

A consideration of the various methods of shortening the uterine ligaments, as a surgical cure in uterine displacement has been always an interesting subject and one extremely debatable during the past twenty five years. In this time the subject has been reviewed academically at intervals and in every instance a consensus of opinion has been sought regarding the relative merits of the various methods of ligament shortening that have been advocated. Since the review by Alfieri in 1911 no unprejudiced and comprehensive discussion of the subject has been offered. With considerable satisfaction therefore we announce such a discussion of the present status of round ligament shortening in the form of a critical review for the next number of the INTERNATIONAL ABSTRACT OF SURGERY. The author Sidney A. Chaffast of Pittsburgh has brought to bear upon this theme not only the substance of an extensive literature but also a judicious attitude developed out of experience in the ward and operating room.

Other collective reviews to be published during the next few months are:

Mechanism of Fractures	JAMES KIRK, MD, San Francisco
Tuberculosis of the Genito-Urinary Tract	J. H. C. T. GRAY, JR., MD, Boston
A Comparison of the Results in the Conservative Management of Eclampsia	RIKOR PETROW, MD, A. Arbo, Mich.
Surgery of the Bladder	J. B. TAYLOR, MD, New York
Cancer Treatment with the X-Ray, Diathermy and Radium	C. T. K. RICH, MD, Chicago
The Status of the Operation for Strabismus	A. D. LEVINSON, MD, Chicago
Intestinal Obstruction	HARVEY H. STONE, MD, Baltimore
Pelvic Tuberculosis	C. D. HATCH, MD, Chicago
Diagnostic Use of the X-Ray in Intrathoracic Disease	HENRY HULST, MD, Grand Rapids, Mich.
Intestinal Stasis	JAMES T. CARL, MD, Battle Creek, Mich.
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INTERNATIONAL ABSTRACT OF SURGERY

OCTOBER 1916

COLLECTIVE REVIEW

THE SURGERY OF GLAUCOMA

BY EMORY HILL, M.D.

Associate Surgeon, New York City

SOME historic perspective is essential to an understanding of the present status of ophthalmic surgery in regard to glaucoma and the voluminous literature of the subject. No ophthalmic topic is more important and perplexing and none lends itself more readily to argument. Wide diversity of opinion must exist so long as several different types of eye disease are included under one name, the etiology of certain types unknown and many surgical procedures effective in selected cases and ineffective in others. Indeed, the phases of the glaucoma problem seem a far from solution today as in the remote past.

The word glaucoma, *glaukos* sea green, dates back to antiquity. It describes the dilated and dilated pupil in eyes with abnormally high tension and in certain other eyes as well. The term was applied to a number of conditions and not until 1856 was cataract differentiated from glaucoma as an opacity of the crystalline lens. Increased intra-ocular tension was recognized by Pater in 1845, but its significance was not understood until Mucklen in 1883 established the involutionary association of urticaroid changes of the eyelids with the clinical picture of the inflammatory type of glaucoma. Before the invention of the Schiøtz tonometer (1903) the inflammatory type of glaucoma was recognized. The study of the eye was made possible by the instrument which revealed the recognition of an inflammatory type of glaucoma in which the effects of hyperemia are not produced and efficient ad-

justment of the intra-ocular pressure is not an inflammatory reaction. In 1881, J. von Leber described the pathologic changes in the deep structures of the eye. Von Graefe in 1881 was the first to call attention to the error but justly directed to the mistake of attributing glaucoma to hyperemia. The relationship of the eye to the circulation is a starting point for a new era in the study of the eye. Von Graefe in 1881 was the first to call attention to the error but justly directed to the mistake of attributing glaucoma to hyperemia. The relationship of the eye to the circulation is a starting point for a new era in the study of the eye. Von Graefe in 1881 was the first to call attention to the error but justly directed to the mistake of attributing glaucoma to hyperemia. The relationship of the eye to the circulation is a starting point for a new era in the study of the eye.

Subsequent studies of glaucoma have been with reference to the anatomy of the eye. The globe further had a partial explanation of the relation of the eye to the circulation. Leber described the pathologic changes of the eye. The anterior chamber and vitreous body were examined these findings anatomically. In 1903, Israel Smith published a paper on the crystalline lens at various periods of the eye during the process of growth of the eye.

especially after the fourth decade producing a disproportion between the lens and the total size of the eye as compared with the proportion in earlier life. In brief the glaucomatous state is brought about by a crowding forward of the iris against the posterior surface of the cornea at its periphery with a consequent blocking of the exit of the aqueous fluid from the anterior chamber into the canal of Schlemm at the sclerocorneal margin. The hypertrophy of the overfunctioning ciliary muscle in the hypermetropic eye favors the blocking of the iris angle, thus hypermetropia is a predisposing factor in glaucoma. Obviously an inflammatory exudate from the uveal tract produces an excess of intra-ocular contents and such exudate may clog the channels of exit.

Thomson Henderson (3) has advanced a theory of glaucoma within the past decade which has aroused much interest. He believes that the pectinate ligament at the angle of the anterior chamber is a cellular structure in early life and becomes progressively sclerosed with advancing age as a result of the influence of the constantly contracting ciliary muscle, to which he believes this ligament serves as a base of attachment. This sclerosis cuts off the exit of the aqueous and places the responsibility of ocular drainage upon the iris veins which may be inadequate to this excessive demand. In the absence of other causes—vascular nervous, or biochemical—no increase of tension will occur, but the sclerosed structure at the iris angle furnishes an anatomical basis for hypertension according to Henderson, when precipitating causes arise. There is frequently a connection between glaucoma and high blood pressure, but the extent to which general arterial hypertension is responsible for ocular hypertension is still in dispute. Intra-ocular hemorrhage may of course, precipitate a glaucomatous attack.

There is no unanimity of opinion as to these various theories, and we must be content at the present time to say that an imbalance between the formation and excretion of intra-ocular fluids, normal or abnormal, gives rise to hypertension of the globe. Variations in intra-ocular tension are quickly compensated for by variations in out flow under normal conditions. Numerous factors may impede drainage and cause hypertension. In the words of Priestley Smith, glaucoma signifies an excess of pressure within the eye, plus the causes and consequences of that excess. It is not a disease entity but a term applied to a symptom-complex which may be the manifestation of a variety of diseased conditions. Indeed, the symptom-complex varies within wide limits,

from the violent inflammatory glaucoma to the simple chronic form of insidious character which some observers would not class as properly the same disease. Moreover glaucoma may be the direct result of a pre-existing or coincident inflammatory process or trauma of the eye (secondary glaucoma) or may be independent of any other demonstrable disorder of the eye (primary glaucoma). A distinct type of the symptom-complex is congenital or infantile glaucoma (hydrophthalmos or buphthalmos) in which the eye is greatly enlarged by stretching of its tunics in intra uterine life or in infancy.

With many kinds of eye disease, varying in cause and clinical course, classed together under one name because of one common symptom, increased hardness of the eyeball and with simple glaucoma remaining one of the mysteries of medical science, it is natural that many kinds of treatment have been tried and none found successful in all cases. The fact that glaucoma is a manifestation not merely of a diseased eye but of a diseased body as well is being emphasized and a more comprehensive study of these cases is being made than in former years. While awaiting the establishment of a definite etiology and an effective prophylaxis it is the difficult task of the ophthalmic surgeon to seek to obtain permanent drainage of the ocular fluids and avoid certain dangers incident to the maintenance of the drainage. The reports of efforts to accomplish this task fill the pages of ophthalmic literature of recent years.

The surgery of glaucoma is discussed at length in the many textbooks of ophthalmology and with especial fullness in the American Encyclopedia of Ophthalmology (4) in which the following convenient classification is made: (1) operations on the posterior half of the globe, (2) operations on the anterior half of the globe, and (3) operations on the sympathetic system of nerves. A brief consideration of the older operations under these three headings will serve as a background to a more critical study of the recent extensive literature dealing with newer operations.

1. *Operations on the posterior half of the globe* consist in puncturing the tunics of the eye (sclera, choroid, and retina) for the purpose of allowing the escape of some of the vitreous humor. This procedure affords a rapid decrease in intra-ocular tension by lessening the intra-ocular contents but is transient in effect as the wound quickly heals. Goulin of Lyons is credited with this operation of posterior sclerotomy as far back as 1769. As now performed the operation

usually requires only local anesthesia (cocaine) after which the conjunctiva is grasped with forceps near the sclerocorneal limbus and the globe rotated so as to allow the entrance of a Graefe cataract knife as far back as possible into the vitreous chamber. A quick puncture of the tunics passing the knife several millimeters in and a slow withdrawal give the minimal result, namely the escape of a small bead of vitreous. A somewhat greater immediate effect and also a more prolonged effect is obtained by an L-shaped incision in which the knife after the puncture is rotated on its long axis 90° and withdrawn so that two linear cuts in the form of a letter L are produced. This wound allows more gaping and heals more slowly than the simpler incision first described.

2 The simplest of the many operations on the anterior half of the globe aims to accomplish the same result. Paracentesis of the cornea is performed by incising this membrane just within the sclerocorneal limbus with a small keratome or a Desmarres needle which is a small lance with a thickening at its base to prevent the needle's entering beyond the desired distance. Slow withdrawal of the instrument with gentle pressure against the posterior lip of the wound allows the anterior chamber to empty. Local anesthesia is often sufficient for this as for the preceding operation, but very high tension with engorgement of the ocular circulation diminishes the effect of local anesthetics and therefore safety sometimes demands the use of general anesthesia. Miotic drugs, as eserine, are practically always used both before and after these operations. The corneal wound can be opened by gentle manipulation with a small spoon or spatula and the effect of the operation renewed for several successive days in this way.

Such transient lowering of tension is of service in the presence of a presumably transient hypertension where permanent relief may be expected in a few hours or days as in the secondary glaucoma occurring in the course of an iridocyclitis or traumatic cataract when the filtration angle is blocked by nival exudate or lens matter or blood. In acute inflammatory glaucoma with a very shallow anterior chamber posterior sclerotomy reduces tension and deepens the anterior chamber sufficiently to allow iridectomy to be performed with safety. It also serves to relieve pain in absolute glaucoma, and to reduce tension temporarily in both acute and chronic secondary glaucoma.

Iridectomy The very brief duration of the beneficial result of these simple puncture operations limits their usefulness. The procedures

promising a more prolonged effect constitute the bulk of the operations performed upon the anterior half of the globe. Of these the classic iridectomy of von Graefe (1850) has been mentioned. The detailed description of the operation is available in the textbooks and need not be repeated here. It is necessary, however, to consider some features of this operation at length in order to understand the present-day problems of glaucoma surgery. Iridectomy is so important an operation that every other method of reducing intra-ocular tension has to bear rigid comparison with this time honored procedure. It is also noteworthy that the excision of a piece of the iris is one step in many other operations whether an essential or a negligible step is a question which concerns us greatly.

The use of miotics and in the presence of an acute glaucomatous attack a preliminary posterior sclerotomy increase the safety of iridectomy. Local anesthesia suffices in non-inflammatory cases but general anesthesia is necessary in the inflammatory type where tension is very high and but little effect is secured from cocaine. A wide keratome is preferred by most operators except when a very shallow anterior chamber makes it difficult to pass a keratome between the cornea and lens without injuring one or the other. In this case a narrow Graefe cataract knife is used. The incision is regulated so as to open the angle of the anterior chamber which is posterior to the visible sclerocorneal limbus. Unless this is accomplished the iris cannot be cut or torn at its ciliary attachment or root and the purpose of the operation is defeated. Therefore the incision and the iridectomy are essentially different from the procedures used when iridectomy is performed for optical purposes and as a preliminary step in the extraction of cataract. Bearing in mind this important difference the surgeon begins his keratome incision 2 mm. back of the upper limbus piercing the sclera with the blade nearly perpendicular then depressing the handle as soon as the tip of the keratome is seen in the anterior chamber and pushing the blade forward between the cornea and iris in the plane of the latter until the incision is 9 or 10 mm. in length. The keratome is then cautiously withdrawn allowing the aqueous to flow out slowly. The incision may be lengthened by pressing the edge of the keratome against one angle of the wound while withdrawing but it is desirable to make the entire incision while the keratome is advancing through the anterior chamber unless the shallowness of the chamber makes sufficient advance of the instrument dangerous to lens and

The withdrawal of the keratome requires great care and precision to avoid a sudden rupture of the aqueous and consequent prolapse of the vitreous with intra-ocular hemorrhage. Beginning with an extremely shallow anterior incision the Graefe knife may be used as in the method for extraction of cataract except that the incision is made 1.5 mm. beyond the visible corneal limbus at one side about 3 mm. the horizontal diameter of the cornea and enters puncture at a corresponding position on the opposite side and the knife emerges 2 mm. behind the upper limbus. Perhaps no more difficult technique is required in the domain of surgery than is demanded of one who operates correctly an iridectomy for glaucoma and the difficulties and dangers of such cases, with the issues at stake are ample; for the large amount of space devoted to this subject in surgical literature. After the operation is completed it is well if local anesthesia is used to place a sterile eye-dropper behind the posterior lip of the wound and making pressure to open the wound slightly place a pledget of cocaine directly on the iris to insure complete anesthesia. Iris forceps are now with closed blades into the anterior chamber opened to grasp the iris near the pupillary margin.

Slowly withdrawing the forceps the iris is drawn through the wound. With the protractor drawn taut a snip is made with iris scissors through the portion of the iris next to the edge of the wound further pulling toward the angle of the wound tears the iris from its attachment and a final cut with the protractor in severing about one fifth of the iris attachment thus opening the angle anterior chamber. Unless the iridectomy is made and extends back to the root of the iris the purpose of the operation is not accomplished. It has not been sufficiently appreciated and it has failed to relieve glaucoma by many are in many instances to be attributed to poor performance of the iridectomy.

It is difficult to formulate any generally accepted theory as to the way in which iridectomy cures of glaucoma or the limitations to the use of this operation. That the pulling of the iris back to its root removes the obstruction to the exit of intra-ocular fluid through the angle of Fontana at the iris angle is perhaps the widely accepted explanation. That the tearing of the iris does not adhere but remain as a space allowing drainage of the aqueous into the veins is an observation which bears upon

this question. It has been maintained that the iridectomy is an unimportant feature of the operation and that the effect is in reality attributable to the scleral incision. It should be emphasized that iridectomy aims to reopen the natural channel of drainage in contrast to some of the more recent operations which attempt to produce new channel. The most positive statement which one can make about iridectomy is that it has a permanent place in the relief of acute inflammatory glaucoma. Whether the new operation will replace iridectomy in this class of cases remains to be seen but for the present no other method of restoring the balance of intra-ocular circulation shows equal results. The earlier the operation the more successful the result. When destruction of the angle is due to vascular congestion and not to permanent adhesion of iris to cornea, as in the chronic type of glaucoma, iridectomy removes the obstruction. In subacute glaucoma the effects are somewhat less sure. In the chronic form (simple glaucoma) the results are not sufficiently uniform to give satisfaction. The tabular iridectomy in acute glaucoma is indicated by the tabulation of Wygodzki (5) showing a favorable outcome in 80 per cent of all cases. In glaucoma simplex statistical report lack conformity. Hallauer (6) found tension reduced to normal in 80.5 per cent of cases with recurrences in 31 per cent. Von Hippel (7) believes that iridectomy is urgently called for as the surest means of combating glaucoma. De Wecke (8) found that nine tenths of a group of 20 ophthalmic surgeons favored iridectomy in glaucoma simplex while the remaining one-tenth considered it comparatively useless. In hemorrhagic glaucoma and buphthalmos iridectomy is disappointing. A persistent effort has been made to find more effective operative procedures for these less favorable types. These methods concern chiefly the drainage of the aqueous and therefore belong in the classification of operations upon the anterior half of the globe. They have been conveniently divided into (a) operations which attempt to effect a communication between the anterior chamber and the subconjunctival spaces (b) operations which attempt to effect a communication between the anterior chamber and the vitreous and (c) operations which attempt to produce drainage through the choroid and the suprachoroidal spaces.

a. The operations which attempt to effect a communication between the anterior chamber and the subconjunctival spaces are based upon the

two procedures already discussed paracentesis of the cornea and iridectomy. Thus de Wecker practiced anterior sclerotomy (1867) in which substantially the incision with the Graefe knife as used in the iridectomy operation is made but a bridge of tissue 2 mm. wide is left intact behind the upper limbus to prevent prolapse of the iris. In this way a filtering cicatrix is utilized for securing additional drainage at the angle of the anterior chamber. De Wecker considered this procedure a valuable preliminary step to iridectomy when the anterior chamber is very shallow. He preferred it to other operations in combination with miotics in chronic glaucoma and in the other types of the disease in which iridectomy is not highly satisfactory as hæmorrhagic glaucoma and buphthalmos and as a means of reducing pain in absolute glaucoma. The operation has not been used extensively in recent years. Various modifications of it were made with the addition of incision into the iris tissue. Panas (9) (1884) practiced iridosclerotomy in which he passed the knife through the iris from before backward traversing the posterior chamber and again piercing the iris before making the counterpuncture. Kries (10) (1893) used a keratome and attempted to produce an indochylolysis pulling the iris away from its ciliary attachment. De Wecker accomplished the same result by tearing the iris with forceps passed into the anterior chamber. De Vincenzus (11) (1893) used a sickle-shaped knife with a convex cutting edge, sweeping around the angle of the anterior chamber cutting the tissues to a depth of 1 mm. or more. Obviously these several methods have the common aim of the original iridectomy operation and all endanger the crystalline lens none of them has become popular.

b The observation that excess of intra-ocular fluids exists mainly in the vitreous chamber as evidenced by the bulging forward of the iris from pressure behind it, has led to attempts to effect a communication between the anterior chamber and the vitreous in order to restore normal depth to the anterior chamber and open the iris angle. Thus Chibret (12) (1898) practiced sclero-cyclo-indic puncture, using a double-edged Graefe knife entering 3 or 4 mm. behind the limbus and passing obliquely through the sclera into the angle of the anterior chamber. The iris was pushed forward by the knife and its ciliary attachment loosened. This procedure was repeated in 5 or 6 meridians. Severe hæmorrhage into the anterior chamber is a disadvantage in such an operation. Sclerotomy in antero-

posterior has been done after an unsuccessful iridectomy. A Graefe knife is introduced into the anterior chamber and passed backward through the coloboma into the vitreous. This is practically limited to use in blind eyes where injury to the crystalline lens is negligible. Fern (13) (1899) practiced cyclo-indo-vitreous puncture after iridectomy. A very small Graefe knife is passed through the coloboma to the circumferential space and lateral movement made to widen the cut. All these methods are so dangerous as to be practically limited to eyes in which vision is already lost. They like the preceding group have not become popular.

c The attempts to produce drainage through the choroid and the supra-horoidal spaces have differed somewhat from the previous group. Here the effort has been to sever the attachment of the ciliary muscle to the sclera. Hancock (14) used a Beer's knife entering at the sclero-corneal limbus below and temporally and incising the sclera obliquely backward for more than one-eighth inch. Walker used a narrow knife entering the cornea just within the limbus with the cutting edge directed away from the anterior chamber. Thrusting through the base of the iris he withdrew by cutting out through the sclera. Quereghni (15) (1900) attempted by means of a scleral incision with a narrow knife to enter the posterior chamber and to incise the choroid by sawing movements from within outward. These operations are dangerous and deserve mention only as predecessors of the more important recent measures.

In addition to these many operations upon the eyeball brief mention must be made of (3) *operations upon the sympathetic system of nerves*. The operation of excision of the superior cervical ganglion was based on the observation that section of the sympathetic results in a soft eye which seems to have been known as long ago as the early years of the eighteenth century. The effect of cutting the ganglion is greater than that of cutting the cord but both are temporary. The influence is probably vascular and muscular through Mueller's muscle at the apex of the orbit. Jonnesco (16) (1899) removed the superior cervical ganglion by means of an incision parallel to the anterior border of the sternomastoid muscle opposite the angle of the jaw dissecting between the carotid artery and vein until the ganglion is exposed behind the artery. The ganglion is freed from its surroundings and cut with scissors the ascending and descending cords are cut likewise. Though favorable results have been re-

ported the effects are not permanent and several deaths have followed. Excision of the ciliary ganglion has also been attempted. Rohmer (17) made a Koenlein resection of the outer wall of the orbit divided the external rectus muscle and passed forceps along the side of the optic nerve attempting to grasp and crush the ganglion. The operation is difficult the actual destruction of the minute ganglion embedded in orbital fat uncertain of accomplishment and the operation has not found favor in spite of some reported successes. Avulsion of the infratrochlear nerve was attempted in 1893 by Badal (18) to relieve pain in glaucoma. The results were temporary. All of these procedures have fallen into comparative disuse and in the literature in recent years no tendency is shown to attack the glaucoma problem from the direction of the sympathetic nervous system.

One new operation upon the posterior half of the globe deserves mention. In 1913 Wichter kiewicz (19) suggested what he termed *sclerodermis cruciata multiplex* where operations upon the anterior half of the globe had failed in securing permanent result. He exposed the sclera extensively by dissecting back a large flap of conjunctiva and Tenon's capsule and made from four to six parallel meridional incisions with a Graefe knife as far back as possible, each 10 to 12 mm long, through the sclera, and then as many more incisions at right angles to the first series. The flap was then sutured into place. Immediate massage enhanced the effect. This operation seems to have made no headway in the presence of the many rivals now attracting attention.

Heine's cyclodialysis (20) is of more importance. The one method of securing drainage through the suprachoroidal space which has obtained favor is that devised by Heine in 1905. He seems to have received the suggestion from Fuchs' observation that detachment of the choroid sometimes follows cataract extraction and iridectomy and occasional subnormal tension. Under local anesthesia a large conjunctival flap is dissected up from the lower temporal quadrant. A 2-mm. cut through the sclera is made 5 mm. back of the limbus and parallel to it. This incision is made carefully with a keratome to avoid injuring the uveal tissue beneath. The black color of the uvea indicates that the sclera has been penetrated. A spatula, slightly curved at the end is passed gently within the scleral wound and worked forward between the sclera and the ciliary body with its plane parallel to these structures until the tip appears in the anterior chamber. Sweep-

ing the spatula from side to side widens the tunnel beneath the sclera. Hemorrhage from the anterior ciliary vessels is a complication which interferes with the good results of the operation unless the blood absorbs quickly injury to the lens must be carefully guarded against. The conjunctival flap is sutured and stitched.

The operation has been advised especially in chronic glaucoma both as the operation of choice and as a resort after iridectomy has failed, in cases in which iridectomy cannot be performed and in puphthalmos. Meiler () has tabulated the results of cyclodialysis as follows: 1) permanent reduction of tension in about 30 per cent of cases after the first three days; 2) temporary reduction of tension in about 40 per cent of cases; 3) the ease of tension recurring after a few days; 4) no effect on tension in about 10 per cent of cases; especially in absolute glaucoma. Wucher and improvement in 57 per cent of cases after 20 being observed for a period of six to seven years; temporary improvement in 25 per cent; 5) showed no improvement. Meiler and Wucher reported 54 operations, concluding that cyclodialysis is designed especially for chronic glaucoma but that it exhibits no marked difference in effectiveness from iridectomy. They emphasize the danger of hemorrhage from the anterior ciliary vessels. Knapp thought after an experience of 18 cases that the operation is not an adequate substitute for iridectomy.

Of chief interest among the innumerable procedures suggested for the relief of glaucoma, in addition to cyclodialysis are those which have come into vogue in the past decade as a result of dissatisfaction with the older methods of treating the chronic types of glaucoma in which iridectomy is of uncertain value. Gradually the opinion that a soundly healed cicatrix possesses filtration properties has lost favor and operators have attempted to produce a permanent path of exit for the aqueous through the scleral tissue by creating a cystoid cicatrix. Two special methods of producing this are by the use of a trephine to remove a button from the sclera, and the deliberate incarceration of iris tissue within the scleral wound. Thus the newer operations may conveniently be studied under the three headings of (1) cystoid cicatrix, (2) trephine operations, and (3) incarceration operations.

1. *Cystoid cicatrix*. The first important operation devised to obtain a cystoid cicatrix was the *iridodesclerectomy* of Lagrange (21) (1906). After the use of cocaine and local anesthesia a

Graefe knife is used as in the operation of iridectomy, puncture and counterpuncture being made well back of the limbus. The knife is turned backward on completing the incision above and emerges very obliquely behind the upper limbus making a large flap. The sclera contained within this flap is then cut out with fine curved scissors. An iridectomy is made and the conjunctival flap replaced. Lagrange at first advised iridectomy in all cases but later limited its use to cases in which there seemed to be danger of prolapse of the iris if left intact. He holds the operation to be especially adapted to simple chronic glaucoma and has protested against its unlimited use in all varieties of glaucoma. The thickness of sclera removed may be regulated according to the amount of weakening desired in the sclera, the amount of sclera excised being in inverse proportion to the degree of hypertension. A valuable discussion of the merits of the Lagrange operation was made by Ballantyne in 1910 (3). Further consideration of it will be given by comparison with some of the other procedures to be described.

Holth's (6) punch forceps operation is an important modification of the Lagrange method. In order to lessen the size of the scleral opening and to regulate the excision Holth made a less extensive incision and having dissected away the conjunctiva from the underlying sclera of the anterior lip of the wound he removed a bit of this scleral flap with punch forceps. The excised sclera measured 3 x 1.5 mm. This operation has been practiced with much success. Butler (24) prefers it to any other on account of ease, safety and quickness of execution.

In 1909, Herbert (25) described what he termed the wedge isolation operation which he considered superior to the Lagrange in that the incision is shorter, the iridectomy smaller and the amount of scleral excision better regulated. This operation has not gained favor to the surprise of those who have witnessed Herbert's results, probably because of the difficulty of gaining a clear idea of the minute details from a written description even so carefully and fully stated as Herbert's own description. The following brief resumé will indicate the difficulty. An old Graefe knife ground down to a breadth of less than 1 mm. is used. Puncture and counterpuncture are made high up so that the anterior chamber is traversed for only a short distance in its upper portion. The incision continued upward and backward until the sclera is cut through but a bridge of conjunctiva is left uncut. The knife is then pushed back into the

scleral wound and turned upward and forward so as to make a second cut through the sclera from behind forward. This serves to isolate a wedge of sclera with the apex toward the anterior chamber. Subsequent shrinkage of this wedge leaves a filtration area. A very small peripheral iridectomy is made without the necessity of cutting the bridge of conjunctiva. Herbert's first report indicated satisfactory results in 10 cases.

Trephine operation. Arkell, Robertson (1) used a scleral trephine fifty years ago. Strahlbridge of Philadelphia, Howes and Butler and Frickhich also used a similar instrument but the procedure seems to have continued only until Fergus (5) used it in connection with a scleral flap. He dissected the conjunctival flap up to the corneal margin and beneath it made a trephine opening through the sclera 2 or 3 mm. back of the limbus. He then passed a spatula through this opening and separated the sclera from the ciliary body and the iris until the spatula appeared in the anterior chamber. Some confusion has arisen between this and the trephine operation of Elliot. The latter is sometimes called the Fergus-Elliot operation. The facts are that Fergus practiced his operation independently of Elliot and before Elliot's first publication (1909) but did not describe it in the literature until a few months later and of more importance the two operations differ in such essential feature that there is no justification for confusing them. Elliot makes the trephine opening in the corneoscleral junction entering the anterior chamber and making an iridectomy. Fergus trephines entirely in the sclera and enters the anterior chamber only after tunneling between the sclera and the uveal tissue. The route for the evacuation of aqueous is different in the two cases.

Elliot's operation (9) was developed from a large experience in the British medical service in India. He dissects up a large conjunctival flap with the base at the upper sclerocorneal limbus. Reflecting this flap over the cornea and holding it with forceps from below, he steadies the globe and continues the dissection with blunt scissors going between the lamellae of the cornea so that the trephine can be placed astride the limbus and the buttonhole include corneal as well as scleral tissue. It is essential that the dissection go below the superficial tissues getting well down to the sclera proper in order not to buttonhole the conjunctiva. The trephine hole is 2 or 2.5 mm. in diameter. Various models with handles constructed for the convenience of the operator and with diameters varying from 1.5 to 3.5 mm. have

been manufactured. Holding the trephine over the limbus, making sure to include the cornea in the incision, the cutting edge is inserted by means of a few twists of the fingers. Further revolving of the instrument effects a passage through the sclera. Experience enables one to be sure that he has entered the sclera without withdrawing to inspect the incision. Firmness in holding the instrument and the use of very little force are necessary. The sensation of resistance to the instrument ceases when the trephine cut is complete and aqueous wells up around the trephine. Elliot makes slightly more pressure on the corneal side of the incision so as to be sure of going well forward and entering the anterior chamber. Thus a hinge may be left on the scleral side of the incision and hold the button which in this use can be removed by one snip of the scissors. This same snip of the scissors may also be utilized for accomplishing a small peripheral iridectomy if the iris presents in the buttonhole. Elliot did not at first regard the iridectomy as an important feature of his operation. In fact he has never attempted to make the type of iridectomy described in the classical operation but practically he finds that a small peripheral iridectomy is useful in preventing prolapse and consequent obstruction of the trephine opening. The conjunctival flap must be carefully replaced. Some operators prefer to secure the flap in place by stitches but it is generally considered sufficient to stroke the flap with a spatula until it is thoroughly spread over its original bed. Eserine is instilled if the iris tends to prolapse otherwise no drops are used. The anterior chamber remains shallow for a long time and the tension correspondingly low. A bleb of conjunctiva indicates the site of the scleral opening.

Fox (30) has utilized the Van Lint sliding flap making a quadrilateral flap of conjunctiva with the attached base at one side so that the flap can be drawn over the upper portion of the cornea, covering the trephine opening, and sutured at the opposite side. David Priestley Smith (31) uses a keratome instead of the trephine and makes a triangular incision in the anterior lip of the keratome wound by means of two converging cuts of the scissors, so that the apex of the triangle points toward the center of the cornea. Elliot in several later contributions has defended his operation for practically all varieties of glaucoma. He now makes an iridectomy in all cases and uses atropine to forestall the "quiet iris" which is likely to occur. He objects to the sliding flap. He does not admit that the technical difficulties

of the operation are beyond the skill of the moderately experienced ophthalmic surgeon.

3. *Incarceration operations* Curiously the accident against which ophthalmic surgeons have always guarded namely the incarceration of iris tissue into the scar of a scleral or corneal wound has been practiced deliberately in recent years. Several observations have led to this. It has been frequently noted that such incarcerations left the tension permanently lowered and that aqueous leaked into the subconjunctival space that in dextromas (or glaucoma) in which the operation was technically most imperfect iris being entangled in the wound gave very satisfactory results and that the danger of infection is minimized if the prolapsed iris is covered by conjunctiva. Therefore several surgeons were bold enough to attempt to incarcerate the iris in a small scleral wound. Herbert (3) has discussed the subject fully in the English literature and has described several procedures in which he has incarcerated iris and also conjunctiva in the scleral incision. Holth (13) has practiced with much success his operation called *iridocentesis*. He makes a very oblique keratome incision beginning far back of the upper limbus so as to have a broad layer of conjunctiva. After a small peripheral iridectomy he draws a fold of iris into the wound and leaves it covered with conjunctiva. The anterior chamber remains empty for a long time. Various modifications of this method have been made. Most of the reports are less favorable than those of Holth himself who records 75 to 85 per cent of cases with satisfactory cataract scars. Schiøtz, on the other hand, obtained only 28 per cent of satisfactory scars.

Borthen's *iridotaxis* (34) is the most important modification of Holth's method. Borthen does not incise the iris but draws it into the wound so that the posterior surface of the iris lies against the conjunctiva with the sphincter well beyond the scleral opening. He uses atropine so that the sphincter will be paralyzed and not tend to draw the iris within the wound. This operation is not advised in the presence of an atrophic iris. Comparison of 26 cases of iridotaxis with 26 done by Holth's method convinced Borthen of the superiority of iridotaxis. Roy (35) has reported favorably on 9 operations after Borthen's method. He emphasizes the importance of a small opening into the anterior chamber just enough to admit the iris forceps so that the iris is held within the wound and does not slip back into the anterior chamber. Roy has not used atropine but is

pleased with the simplicity of the operation and the lack of post-operative irritation. He quotes a personal communication from Borthen stating that the latter has performed iridotaxis 242 times since 1908 and finds no need of using any other method. Borthen considers the good results due to the increased drainage through the spaces of Fontana in consequence of the stretching of the iris rather than to the type of cicatrix. Mayer (36) has sought to accomplish the same end by making an iridodialysis through pulling on the iris with two pairs of forceps and placing the loop of iris thus torn from its base within the scleral wound. He leaves it so for one week when he cuts off the protruding part. Harrower (37) records 7 cases of iridotaxis with good results in every case.

Foreign-body drains Another type of glaucoma operation which promises some usefulness is the insertion of a foreign body drain beneath the conjunctiva and in the anterior chamber. Mayou (38) in 1912 utilized a short thread with a knot tied in it. He pushed the knot into the anterior chamber leaving the two ends of thread in the subconjunctival space with the flap of conjunctiva carefully replaced over it. Zorab (39) in the same month reported his operation of aqueoplasty which differs from Mayou's operation only in the fact that the loop of thread passed into the anterior chamber has no knot in it. The gradual absorption of the thread is thought to leave a fistulous track for the drainage of aqueous into the subconjunctival space. Casey Wood (40) (1915) has modified these procedures in the following manner. He uses a narrow Graefe knife with a hole in the end of the blade like the eye of a needle. After puncture and counter-puncture in the usual way he threads the knife blade with silk and withdraws it through the same openings leaving a double thread in the anterior chamber. The loop of thread is now cut, freeing the knife; thus four ends of thread are left two on each side which are threaded to small curved needles. Each needle is passed as far as possible through the episcleral tissues, each in a different direction. Each thread is now cut at its emergence from the conjunctiva. Four paths of exit for aqueous are thus made by the gradual absorption of the silk. Arthur Prince (41) makes use of a gold horseshoe shaped wire, passing it into the anterior chamber with the ends resting in the scleral wound which is made by either the Lagrange or Elliot method. Vail (42) has recently reported an experience in 1907 with a case of absolute glaucoma in which he in-

serted a silk thread through Tenon's capsule into the vitreous. This resulted in normal tension and absence of pain for a period of two years until the patient's death. Vail suggests the advantage of utilizing a natural channel of drainage such as Tenon's space and avoiding a thin conjunctival covering.

These operations offer the theoretical objection of a foreign substance left within the eye which may excite inflammatory reaction. More time must elapse before any opinion can be expressed in regard to their effectiveness and safety.

This résumé by no means exhausts the list of operations suggested for the relief of glaucoma. It merely covers the more important procedures which are practiced at the present time together with some which are too new to admit of any conclusions. It would be a bold attempt to pass final judgment on the popular operation which have been described; indeed dogmatic statements on the surgery of glaucoma are decidedly out of place. One may hope rather to point out some general principles that seem to be well established and to present the favorable and unfavorable experiences with the several types of operation now in vogue as they are recorded in the literature.

The simple procedures as posterior sclerotomy and paracentesis of the corner still have a place and probably always will as valuable temporary expedients for lowering intra-ocular tension until certain transitory causal factors of hypertension cease to operate and as a preliminary to more radical measures. Massage of the globe deserves a place among these temporary measures. The fulminating type of glaucoma sometimes requires such preliminary treatment before iridectomy can be safely done. The secondary glaucomas can be tided over by such comparatively simple measures until the primary condition is brought under control. The severe pain of absolute glaucoma may be relieved by evacuation of ocular fluids and enucleation sometimes avoided. Acute exacerbations in chronic glaucoma can be likewise handled.

Inflammatory glaucoma has always been the most favorable type for cure by iridectomy. This type is of the nature of an inflammatory edema shutting off the exit of aqueous by the apposition of the iris to the cornea at the angle of the anterior chamber. Removal of a large piece of iris well back at its ciliary attachment is a logical means of removing this obstruction. Results are prompt and permanent in a large majority of cases. It is reasonable to expect

a degree of vision nearly equal to that which existed previous to the attack. The earlier the operation the better the prognosis. An atrophied iris contra indicates the operation, as does a very much contracted field of vision.

If all glaucoma were inflammatory the search for operative means of controlling it would probably have gone no further but the less favorable results of iridectomy in simple glaucoma have created a need for other operations and these operations have been tried also in the inflammatory type. These facts illustrate a tendency, not altogether fortunate, to extend the use of surgical procedures beyond the purpose for which they were first designed and to bring disrepute upon measures which are entirely proper when not misplaced. Thus the Elliot trephine operation and the incarceration methods have been practiced, not only in simple glaucoma in which there has been urgent need for some more effective treatment than iridectomy but also in acute inflammatory glaucoma. Such a series of cases as that of Gross, 237 cases, in which 96 per cent of those iridectomized in the prodromal stage and 87 per cent in the acute stage were successful would convince most surgeons that no more is to be expected from other types of operation than from iridectomy. On the other hand the results of some of the newer operations would justify their use by operators who have mastered their technique. If there were no greater dangers incident to these operations than to iridectomy. Unfortunately however there is the danger of subsequent infection through the thin covering of conjunctiva which is the only protection to the interior of the eye in the operations which secure a cystoid cicatrix. It is too early to say just what place these operations may come to occupy in the treatment of acute glaucoma but for the present it seems wise to depend upon iridectomy in this type of case rather than to risk the danger of late infection after another operation which has not yet proved its superiority. Thus Butler and Evans (43) report a series of 70 cases of acute and subacute glaucoma in which normal tension was secured in 88 per cent after iridectomy and in 83 per cent after various of the newer scleral operations. In the latter cases these authors call attention to the accompanying iridectomy which they believe to be the secret of the good results.

Certain cases of inflammatory glaucoma present technical difficulties to the performance of iridectomy and Heine's cyclodialysis may be utilized instead for example the fulminating type in

which the anterior chamber is obliterated and an iridectomy is impossible and when old people must be operated on who cannot be safely kept in bed. Cyclodialysis is not to be regarded as a satisfactory substitute for iridectomy but may be a necessary expedient to secure a greater effect than the simple punctures of the sclera or cornea.

Glaucoma simplex presents a larger and more difficult problem. This is not the place to enter upon a discussion of the relative merits of medical and surgical treatment for this type of glaucoma. Suffice it to say that there is a considerable trend of opinion in favor of miotic drugs to control tension in these cases. The facts that such drugs are sometimes inadequate and always entail tedious and prolonged administration which few individuals will or can submit to militate against their use without operative intervention. The question therefore is pertinent. What is the operation of choice in simple glaucoma?

The lack of such brilliant results from iridectomy in this type of glaucoma as in the inflammatory type must not be taken to mean that iridectomy is of no avail. Hallauer's figures, showing 80.5 per cent with tension reduced to normal and 35 per cent of recurrences disprove such an idea. Butler and I also record 91 cases of chronic glaucoma with 70 per cent showing normal tension after iridectomy and 87 per cent showing normal tension after trephining. These figures indicate the unsatisfactory degree of effectiveness of iridectomy and the greater value of a cystoid cicatrix. Rochon-Du Signaud (44) states that about 70 per cent of trephine cases in simple glaucoma and chronic glaucoma with inflammatory intermissions are successful. Butler records 23 successful cases in 29 operated upon by Holth's punch method which he preferred to all others in 1909. Morax and Fournere (45) considered Holth's the method of choice and Elliot's next. The value of statistics would be greater if more explicit terms than "successful" were used. It is evident that the past decade has witnessed an important development in the surgery of chronic glaucoma. That a cystoid cicatrix secures drainage of ocular fluids sufficient to keep intra-ocular tension within safe limits, and does this more effectively than iridectomy in this variety of glaucoma is now an established fact. Which of the numerous procedures designed to make such a filtering wound is to be preferred may not be stated with such positiveness.

Elliot believes his operation possesses very

distinct advantages in practically all cases of glaucoma. Lagrange has emphasized the limitations of his operation and insisted that it be not used as a substitute for iridectomy in cases which are most suited to the latter. He reported 84.4 per cent of successes in glaucoma simplex. Meller (46) has made a valuable report on a large series of cases, comparing the Lagrange and Elliot procedures. The Lagrange operation was performed 389 times, the Elliot trephining 15 times. Good results (by which he means sight preserved or if already lost, the globe preserved with normal tension) followed in 69 per cent of the Lagrange operations and in 77 per cent of the trephined cases. The cases terminating badly were grouped together, showing 8.4 per cent in the Lagrange operations and 14 per cent in the Elliot. Meller was impressed with the complications of the Lagrange method and concluded that the smaller scleral opening, far forward in Elliot's method, is a distinct advantage. He found the accompanying iridectomy an important defense against prolapse. He is optimistic about these operations for all cases in which iridectomy is not emphatically indicated; this includes absolute glaucoma, secondary glaucoma and buphthalmos. He credits Lagrange with having paved the way for the safer Elliot procedure. Late infection occurred in 1 per cent of the Lagrange cases and in 17 per cent of the Elliot cases. The fact deserves mention supplementing Meller's report that the Holth punch forceps operation eliminates the chief objections to the Lagrange method with the exception of the necessity of entering a narrow anterior chamber with a knife (which the trephine avoids) and has been used with great success by some operators. Reber (47) feels distinctly more hopeful since the introduction of the Elliot operation. He secured improvement of vision in 13 of 16 cases after this operation; some vision in eyes which were blind when operated upon in 15 cases, and cessation of pain in 6 eyes with absolute glaucoma.

The choice of one of these procedures for securing a cystoid cicatrix is a matter of individual preference on the part of the operator. Whether the incarceration of iris in the wound is an advantage over an iris-free cicatrix is a question which time must answer. Elliot's, Lagrange's, Borthen's and Holth's two operations are just now enjoying much popularity. That possibilities exist of a high degree of development of technique in these procedures is indicated by the fact that the chief objection to the cystoid cicatrix,

late infection of the wound, seems not to be met with by the originators of the operation, while other surgeons are encountering a mishap.

The question of infection through the thin conjunctival covering of the scleral opening is a serious one. While intact conjunctiva is an effective barrier against infection, it is entirely possible that light trauma may at any time cause a minute break in the bulbar conjunctiva which is constantly subjected to by the lid. The most enthusiastic results by the excellent results of these various operations in glaucoma simplex was the abjectly dampened by occasional reports of infection. Up to January 1914 thirteen cases were recorded. Gifford (48) has discussed these at length. Numerous cases have been mentioned in the literature; important observations have been made by Schur, Kuhnt, Axill, and others. Paul has collected a report. May (49) states that nine cases have been reported in these operations, associated with late infection. The mortality which has been experienced by T. Harrison Butler (50) is concluded in an article entitled "The Trephine in Scleritis" with the word "Late infection" a peril which hangs like the sword of Damocles over every eye which possesses a slit-like opening of any type, however obtained. His findings are divided into three classes: 1. Late cases ending in uveitis and panophthalmitis, necessitating the removal of the eye. 2. Case of severe iridocyclitis which destroys the sight. 3. Cases of mild iritis and local inflammation around the aperture which recover. On the other hand, Elliot calls attention to the fact that cases of infection must be judged with regard to the ratio they bear to the total number of cases trephined of which some 100 had been recorded up to October 1914. He makes the following observation: "The condition for which we trephine is not one in which the patient can choose whether he will be operated upon or not. He has his back to the wall and we are fighting for his sight. Risks are then sustainable which would not be worth taking for an operation for cosmetic purposes."

It is impossible to make a generally acceptable statement in regard to late infections. There is no uniformity in experience as yet justifying a final word on the subject. Certainly we cannot be as sanguine in regard to glaucoma simplex as the earlier reports on the new operations seemed to warrant. Yet we cannot fairly offer wholesale condemnation of operations which produce excellent results in a difficult type of disease to

treat, just because a small percentage of the cases suffer from infection at the site of the wound in after months or years. Glaucoma simplex will for the present be combated by means of one of the operations which secure a cystoid cicatrix in the hands of surgeons who are convinced that more cases can be cured by these procedures, after deducting those which later become infected, than can possibly be cured by any other means. This type of glaucoma will not be attacked by means of these procedures in the hands of other surgeons whose fear of late infections leads them to prefer iridectomy or the more temporary expedients coupled with massage and miotics. When cystoid cicatrices are made, patients will be warned that an element of danger exists and precautions taken by frequent irrigation of the conjunctival sac and periodic visits to the ophthalmologist. It seems today that the prognosis of glaucoma simplex is distinctly better as a result of the scleral operations available than it was ten years ago. For a careful exposition of this subject by a master of ophthalmic surgery the reader should consult the textbook of the late Dr. Charles H. Beard (53).

There remain several other types of glaucoma concerning which a few words are necessary.

Hemorrhagic glaucoma does not yield to iridectomy or to the newer scleral operations. There is great danger of destructive hemorrhage following these methods. Anterior sclerotomy is safer as a temporary measure, and may be repeated. Heine's cyclodialysis may be made following posterior sclerotomy. Unfortunately enucleation is the frequent end result of all forms of treatment.

Absolute glaucoma the condition of stony hardness of the globe and extreme pain, may be rendered comfortable at times by posterior sclerotomy and by trephining. These procedures may delay or prevent enucleation.

Secondary glaucoma demands the vigorous treatment of the primary condition. Temporarily the transient punctures of the sclera are utilized. Heine's cyclodialysis promises more prolonged effect.

Buphthalmos is notoriously resistant to all treatment. Anterior sclerotomy may be done repeatedly. Fage (53) reports 14 cases in which this operation gave normal tension and 5 cases in which the growth of the eyeball was checked. Zentmayer (54) has compiled the experiences of a number of surgeons by means of a questionnaire and concludes that some form of sclerotomy is the best procedure of these the Elliot trephining

seems to be preferred. Heine's cyclodialysis has also given some good results.

A discussion of the surgery of glaucoma at the present time must lack finality. The past decade has been fruitful of many ingenious attempts to solve the difficult problem of saving vision in a peculiarly baffling disease. Time will sift these operations selecting the more effective and less dangerous ones for use chiefly in glaucoma simplex. Just now it is more important to study the problem with an open mind than to espouse the cause of any one operator or operation.

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ABSTRACTS OF CURRENT LITERATURE

GENERAL SURGERY

SURGICAL TECHNIQUE

OPERATIVE SURGERY AND TECHNIQUE

Shaw H. A. *Infolding and Peritonealizing Sitch with Application of the Same to Broad Ligament and Gall-Bladder* *Surg. Clin. N. Am.* 9: 6 xxi, 73

Shaw condemns the technique of cholecystostomy as advocated by Williams in *Surgery, Gynecology and Obstetrics*, January 1906. He applies what he calls an infolding and peritonealizing sitch. The advantages claimed for this sitch as summed up by the author are:

Conservation of tissue. In cholecystostomy we are endeavoring to preserve the gall-bladder and rest its function. By this method we certainly do not greatly diminish the capacity of the gall bladder.

2. There is no dead space.
3. It produces perfect inversion in a simple, rapid, and efficient manner.

4. It renders easy the accurate insertion of the drain to just the correct depth. The tack suture in the drain serves the double purpose of fixing it in situ and assisting in preventing eversion of the cut edge.

5. By cutting loop and pulling and tying from both directions, it produces smoother and easier traction and a more symmetrical and tighter purse string around the drain.

The practice of suturing the drain to the abdominal wall is condemned for the following reasons:

It does not allow for the natural mobility of the liver which assumes a somewhat different position, according to posture.

7. The liver to a certain extent participates in the respiratory excursion. Therefore it is unwise to fix the drain to the moving parts, i. e. the abdominal wall and liver.

3. The abdominal sitch is applied after the wound is closed and is almost sure to draw the gall bladder upward or force it into an untoward position.

Shaw then proceeds to apply this sitch to the technique of salpingo-oophorectomy claiming that the special indications of (1) bloodless removal of the mass, (2) closure of the gaping defect in the broad ligament, and (3) peritonealization of denuded areas are all accomplished with rapidity and ease by this

method. He illustrates this procedure by anatomical diagrams.

Arana, G. B. *The Intradermic Suture; Its Technique* *La sutura intradérmica su técnica* *Quinta Med.* 9: 6 xxxi 63

The author discusses the value of intradermic sutures from the cosmetic standpoint in leaving the smallest possible amount of scar on the skin. Chasman introduced this suture method in 1881 and the name of cellular or subcutaneous sutures, and in two recent years, an English surgeon, revised them under the title of subcuticular sutures, although not substantially different from Chasman's, yet coming in the period of antiseptic procedures claimed in the particular attention. Since then the method has been popularized by Lucas and others.

So the description of the technique of intradermic suture is not given as far as Arana can discern from an extensive search in a published work or society report. He describes this technique in the greatest detail and illustrates the various steps of the method so as to make them clearly intelligible. He thinks that this intradermic suture is the only one which is capable of giving a simple linear cicatrix.

With the technique used he considers that longitudinal stitches are best. Horseshoe is used with a Hagdorn needle. It is necessary to obtain a practical acquaintance with the details of the technique as practiced in the operating room. The time consumed is no more than that required for ordinary suturing. Prior to the intradermic suture a continuous suture of the cellular fatty tissues is made which will avoid subsequent hematoma.

Intradermic suture is indicated in all cases where it is desirable to hide a cicatrix and it is formally indicated in interventions on the face, neck, and breast and other visible parts, especially in women. It is employed exclusively in operations which heal by first intention. The method is contra-indicated in septic operations or in cases in which the general state of the patient does not permit of cosmetic considerations. In some cases there may occur as an exceptional result an exuberant cicatrix where the skin is overirritable or very fine, and in such

cases it is necessary to re-operate as the relapse of such an exuberant cicatrix is fatal

W A BRENNAN

Shorten J A.: Continuous Irrigation of Wounds in the Field. *India M Gz* 1916 li 31

The author has devised an ingenious apparatus for continuous irrigation in the field. An empty kerosene tin is placed on a suitable stand and rubber tubing used to siphon the fluid from the can to the wound. By means of adhesive plaster the catheter at the end of the tube is fastened at the desired depth in the wound. The patient's bed is then inclined and the patient turned on his side so as to drain the irrigating fluid and discharges into a rubber sheet draining into a bucket. J H SAILES

Black, C. E.: Some Experiments with Rubber Gloves. *Surg Gynec & Obst* 1916 xxv 0

This paper consists of a series of observations on the sense of touch, in the use of rubber gloves. The author selected six high school students at the Illinois State School for the Blind—3 boys and 3 girls—and had them read a given amount of text (100 words of unfamiliar text) with various weights of gloves and with gloves put on dry, wet and with the hands oiled, gloves which were well fitted and gloves which were loosely and poorly fitted. These various observations were compared with the sense of touch with the bare fingers under the same conditions. The following are the author's conclusions:

1. The use of medium weight rubber gloves requires the blind to use an average of 22 seconds more in reading 100 words of Braille than with the bare fingers, namely 48 seconds with the bare fingers and 60 seconds with medium weight gloves. Or in other words, there is a loss of nearly 30 per cent in the sense of touch judging from the result of this experiment.

2. The tactile sense is materially improved by putting on wet instead of dry gloves, the difference being an average of five seconds, or a little less than 10 per cent. Gloves put on with oil on the hands give a slight improvement over dry gloves, namely 68 seconds as against 60 seconds.

3. The tactile sense diminishes in direct proportion to the thickness of the gloves as shown in our first series of observations where thin gloves showed an average of 1 second, thick gloves showed an average of 106 seconds as against an average of 48 seconds with the bare fingers.

4. A marked improvement in the tactile sense is brought about by the use of carefully fitted gloves as shown in the second series where by "care in fitting" the average was reduced from 60 seconds to 66 seconds.

5. As a final conclusion we may say that the final result of the experiment is that gloves put on wet give the most favorable opportunity for exercising the sense of touch and gloves put on dry give the least favorable.

Bartlett W A: A Clinical and Experimental Study of Post-operative Ventral Hernia. *J Am Coll Surg* 1916 li 31

The causes of post-operative ventral hernia are incisions in abundance of anatomical and physiological principle, improper wound closure, necrosis, infection and tamponade post-operative in healed intra-abdominal pressure and wound union.

Experiment on dogs for union of hernia where one layer was preserved. Hernia resulted where a hole was produced in all layers except skin, muscle and peritoneum, essential repair of these being made by incision of the opposite with overlapping of both healthy fascia lata transposition.

Complete defect were immediately repaired with transplant of fascia, healthy transplant of the reduction of post-operative hernia.

To restore the abdominal wall in these hernias only one to three layers were repaired by union.

The experiment proved that post-operative hernia depends upon two factors, weak wall and hernial tendency.

In the human subject the hernial tendency is corrected pre-operatively by reducing intra-abdominal and intestinal content with rest in bed, liquid diet and catharsis.

The best operative procedure is the airtight utilizing 32 wall and scar tissue but if necessary the abdominal contents may be reduced. If there is undue tension on the reconstructed wall or in the incision with the movements of the lower ribs failure is certain.

Choice of operation depends upon the site of the lesion, the size of the opening and the hernia, the condition of the surrounding tissue and the general condition of the patient.

The varieties of operation are overlapping reconstruction, flap inversion, phlegm and free transplantation.

Kirschner prefers fascia lata because of its easy accessibility in quantity, its strength, inelasticity, adaptability and tendency to heal in.

One reinforcing suture line outside or one inside and outside a complete defect practically insures success.

The after treatment is of vital importance, dealing chiefly with meteorism or straining of any kind.

In the clinical series of 5 operations the results were not known in cases treated with phlegm were failures, 4 had recurrences after the use of the overlapping method while the others were all complete cures.

McVelle O: Pre and Post-operative Care. *Calif St J Med* 1916 li 31

During the past few years many sporadic attempts have been made to standardize the care of the surgical patient both before and after operation. The attempts have nearly always failed to elicit any enthusiasm either because the collaborator had tried to introduce some theoretical methods or

because surgeons as a class, lay more emphasis upon operative technique than upon details of pre and post-operative care. This lack of detail is probably the cause of many poor surgical results.

In this paper the author covers the entire ground of routine pre- and post-operative care in pelvic and abdominal operations upon women. It has been his practice, during the past five years to gradually work up a printed order blank which is left on the patient's chart in the hospital. Enough blank spaces for orders covering individual variations are left on this record but in general, the treatment is very nearly routine.

EDWARD L. CORNELL

ASEPTIC AND ANTISEPTIC SURGERY

Maurel: The Method of Action of Certain Antiseptics and of Procedures for the Decolorization of Their Therapeutic Value (Du mode d'action de certains antiseptiques et des procédés destinés à apprécier leur valeur thérapeutique) *Bull Acad. de méd.*, Paris 9 6 1919 48

Maurel calls attention to the results of his experiments, published 5 years ago, on the leucocytes of the blood, which in the light of recent researches on antiseptics have, he believes, a new significance. The results summarized are as follows:

1. That the pathogenic power of microbes appears to depend on two series of products, one series due to their surroundings and the other to their own substance.

2. The product due to their substance has strong effective action on the leucocyte. It is leucocytocidal.

3. According to Maurel's researches certain physical and chemical agents can diminish the action of this leucocytocidal power considerably and help the leucocyte to resist.

4. The diminution of the leucocytocidal power of a microbe can be very marked without its reproductive power being sensibly modified.

5. Iodoform, iodine solutions, and mercuric bichlorid solutions can have a very marked effect on the leucocytocidal power of microbes, or at least on certain ones.

6. It may be concluded, therefore that in order that an antiseptic agent may have a useful effect on the organism invaded by a microbe it is not necessary that the antiseptic kill the microbe or even that it hinder its reproduction. It is sufficient if it diminishes its leucocytocidal power sufficiently that the leucocyte can triumph. W. A. BARNES

Quénecq, E. The Manufacture of Catgut (La fabrication du catgut) *Bull Acad. de méd.* Paris 9 6 1919 530.

The question of catgut is such an important one in surgery that the Paris Academy of Medicine appointed a special commission to consider and report on the condition of its preparation.

Since Pasteur's discoveries objections have been made to catgut as a suture material and although various attempts at sterilization have been made

laboratory experiments have demonstrated that phenic acid, chromic acid, and sublimate have failed to completely sterilize catgut and some surgeons including Kocher and Terrier renounced its use.

Répin's memoir in 1904 showed the futility of existing methods of sterilization and the use of alcohol under pressure was recommended. It was pointed out that sterilization should commence with the preparation of the string in the first stages. Répin's method more or less modified is still in use.

The researches in this field by Gorn and reported to the Academy early this present year based on the attempt to examine of different lots of catgut showed that the sterilization in alcohol at 60 iodine nor objection to heat completely sterilized certain kinds of catgut. Laboratory experiments at the above mentioned fact clinically observed that infection was possible from so-called sterilized ligatures.

The general conclusion of Gorn from his observations is that the surgeon who is responsible to his patient must not rest satisfied with the ordinary phenic acid sterilization but must go back to the manufacture of the string itself in order to be assured that the ligature submitted to sterilization is really sterilizable.

It is an important point of manufacture that Paris and Lyons. The prime beauty in the manufacture of sterilizable catgut is the use of fresh healthy tissues. In Paris alone the entrails of 500,000 sheep are required annually and at Lyons the slaughter of nearly 5,000 is insufficient for the requirement of the catgut trade. Hence it is necessary to resort to Germany and elsewhere to importation of dry and fermented gut and the first question of sanitary inspection of the sheep at the slaughter is lacking. The difficulty of obtaining sterilized surgical catgut is accentuated when it is remembered that sterilization is not so much an object of concern to the manufacturers inasmuch as nineteen-twentieths of their output is destined for the musical instrument trade.

The commission believes that special treatment is essential from the very beginning of the preparation of surgical catgut following immediately on the death of the animal the intestine should be examined, washed and placed in refrigerators removed as quickly as possible to the ligature factory in not less than from twelve to fifteen hours after slaughter and transported in ice. On arrival at the catgut factory the intestines should be immersed in oxygenated water and split into strands or strips and then submitted to the sterilizing processes.

A special apartment in the catgut factory is necessary for surgical catgut and the necessary precautions must be observed in every phase of the manufacture and drying of the strands to prevent contamination of the intimate part of strands either from the personnel or the workmen from the surroundings.

The report of the commission discusses finally the precaution to be observed in the pharmaceutical sterilization and preservation of the sterilized catgut. The commission expresses the opinion that Répin's recommendation that the sterilized catgut suture material be preserved in bouillon and not in antiseptic fluids is the most adaptable to the greater part of the sterilization procedures and that such a tube of catgut carries with it the irrefutable proof of its purity.

W. A. BRENNAN

ANÆSTHETICS

Hering H. E. von Sudden Death in Chloroform Narcosis (Der plötzliche Tod in der Chloroformnarkose) *M. enchen mod. H. k. z. k.* 1916 *Litt.* 521

For the past four years Hering has called attention to his own findings from animal experiment that sudden death in narcosis particularly chloroform narcosis is due to heart flutter. A review of the literature of the past twenty five years shows that this is fairly well established.

Cats and dogs may die suddenly in the beginning of chloroform narcosis and the sudden death in such cases is due to over excitation of the cardiac chambers. In man unquestionably the same thing is true whenever at the beginning of narcosis the heart action is no longer evident and even if respiration has not stopped. In such sudden deaths in man excitation plays its part.

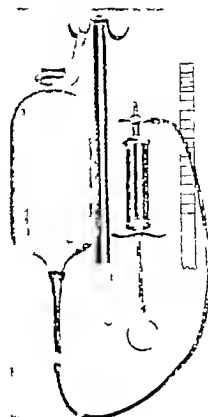
Since extrasystole can be placed in the same category of heart irregularities as heart flutter and may even change into it on the grounds of animal experimentation chloroform should not be administered to patients with extrasystole even when such extrasystole is sporadic only. Moreover since the existence of latent extrasystole can easily be determined chloroform narcosis should be avoided.

W. A. BRENNAN

Bartlett W. A. Method of Facilitating Infiltration Anæsthesia *Am. Surg. Phil.* 96 *Litt.* 678.

In order to avoid loss of time and energy to the operator as well as discomfort to the patient due to the reintroduction of the needle, a number of forms of apparatus have been devised to facilitate the administration of local infiltration anæsthesia. The accompanying cut represents a method which Bartlett has found very efficient and which is very simple. While original with him, a similar apparatus was described by Braun in the second edition of his book. After the usual intradermal injection with a fine hypodermic needle a 9-cm. needle is introduced and a field 18 cm. in diameter can be infiltrated without withdrawing the needle. The graduated container A is filled with 500 to 1000 ccm. of a one half per cent solution of novocaine to which has been added 1 ccm. of adrenalin 1:1000 for every 200 ccm. of novocaine. By means of the two-way cock C the 10-ccm. metal syringe B can be emptied and filled as rapidly as the piston can be forced in and out.

GATEWOOD



Apparatus for administration of infiltration anæsthesia

Leavitt M. A. Rectal Anæsthesia *N. F. M. G.* 1916 *Litt.* 248

The indications for rectal anæsthesia are operations around the head, neck and chest where the element of fear is in evidence.

The method of procedure is as follows: The rectum is prepared by the administration of a cathartic the evening before followed by enemas and suppositories of chlorotone to anæsthesize the rectal mucosa. Twenty minutes after the insertion of the chlorotone morphine and atropine are given hypodermically and twenty minutes later a mixture of oil and ether is introduced in the proportion of 50 to 100 per cent of ether and 50 to 100 per cent of oil. One ounce of the mixture is given for every twenty pounds of body weight not to exceed eight ounces through a rectal tube at the rate of one ounce a minute. In from 10 to 35 minutes the patient goes to sleep. The length of the anæsthesia varies from two and a half to three hours but it may be shortened or lightened by withdrawal of the mixture through a rectal tube. After operation the bowels are massaged and cold water irrigations given to remove the oil and ether. Intravenous injections of normal saline solution may be given if the anæsthesia is too deep.

In only one case was complete failure experienced in the same individual twice. This was thought to be due to resistance to any form of anæsthesia. No untoward results have occurred.

E. K. ARMSTRONG

SURGERY OF THE HEAD AND NECK

HEAD

Morestin II: Very Extensive Shell Wound of the Face. Gradual Reduction of the Resulting Deformity by Successive Extirpation of the Cicatrix (Plaie très étendue de la face par écart d'obus; réduction graduelle de la déformation consécutive par extirpations successives de la cicatrice) *B II et mém. Soc. d'Chir. de Par.* 9 6 xlv, 005

In this article illustrated by photographs which show the very excellent results obtained in a plastic operation for extensive shell wound of the face Morestin calls special attention to the benefits of successive interventions, reducing bit by bit the extent of the cicatrized surface and the mass of sclerous tissue. His knowledge of this gradual method of reduction is based on hundreds of cases of cicatrices and mutilations of the face in his special service. The method is simple as regards manipulations, requires patience and time but gives excellent results, and the author thinks it should play an important part in modern plastic surgery. The method is described in detail.

W. A. BRECKMAN

Eis F. Some Surgical Procedures in Gunshot Fractures of the Mandible. *Practitioner Lond.* 9 6, xcvii, 447

The author tells of his experience while in charge of the surgical side of a military hospital of 350 beds for eighteen months. In many cases the disabilities were present prior to enlistment, but many were accentuated by the unaccustomed physical strain of a soldier's life.

Seventy-one cases of inguinal hernia were operated upon, the Bassini method being used in all except three cases.

Two cases of femoral hernia were also operated upon, Poupart's ligament being stitched to the peritoneal fascia. The after-treatment consisted of twenty-one complete days rest in bed, and the patient was not allowed to resume active duties until three months after the operation.

Sixty-three cases were admitted for operation for varicocele. The high operation over the external ring was done in each case with a vertical incision. These men were kept in bed fourteen days and were given a subsequent furlough of twenty-eight days.

Ten cases of hydrocele were operated upon.

Forty cases of varicose veins were treated surgically.

Thirty-four cases of malformation and malposition of the little toe were operated upon, amputation of the toe being carried out through the metatarsophalangeal joint.

Twent-one cases were operated upon for hammer-toe by removal of the toe.

Four cases were operated upon for hallux valgus and rigidus: excision of the head of the first meta-

tarium was performed in each case. In all but one case there was little or no improvement.

Twenty-one cases suffering from ingrowing toe nail were admitted for operation. The simplest method and one which gave very satisfactory results was to remove the hole of the nail and scrape the nail-bearing area under general anesthesia.

Twenty-three cases of hemorrhoids were subjected to operation, the suture method being preferred.

Twenty-four circumcisions were performed for phimosis, paraphimosis.

Twenty-four internal operations were performed, sometimes with removal of adenoids.

Two cases of internal derangement of the knee-joint were operated upon by resection of the internal semilunar cartilage.

Four cases of undescended testis were operated upon by contrast.

Eight cases of hystula in ano were subjected to operation by contrast.

Five cases with lipoma were operated upon under local anesthesia.

Thirty cases of acute appendicitis were admitted, of which twenty-four were operated upon. There was one death from general peritonitis from perforation of the appendix.

One case of otitis media was admitted which terminated fatally following a tympanocephaloidal abscess.

One case of empyema following pneumonia was operated upon with satisfactory results.

J. H. SKILES.

Baldwin, M. Payne, J. L. Haynes, G. B. and others. Discussion on War Injuries of the Jaw and Face. *Proc. Roy. Soc. Med.* 9 6, v, Odontol. Sect. 05

Baldwin opens the discussion by describing the term, war injuries of the jaws, and the effect of impacts from projectiles on the jaw.

Frequently the bone is not only fractured but comminuted, causing deviation of these fragments, further complicated by the contraction of scar tissue and the formation of diastases if the jaw be improperly treated, or not treated at all. Facial deformities result and the patient's life is made miserable by dribbling of saliva, obstruction of breathing, and many other annoyances. To correct these troubles, apparatus must be used in the mouth, which brings the work inevitably within the sphere of the dental surgeon or stomatologist.

Baldwin visited Paris and Lyons, and found in each of these cities admirable organization of the jaw treatment, and usually a dental surgeon at the head of each establishment. At Lyons, he found under Dr. A. Pont, 350 jaw cases assembled in six large hospitals. Early in the war the lack of stomatologi-

cal service was shown by the number of bad results in these cases. In England, there exists at this time but one military hospital especially set aside for jaw cases. Baldwin believes that it would be well to have such a special hospital in the district of each command in the United Kingdom, and states that the dental and stomatological arrangements of the British army have always suffered from the lack of an experienced officer on the staff of the director general.

Payne relating his personal experience stated that he has treated 22 patients and in addition he visited France in August and December 1915 where he saw large numbers of soldiers suffering from every description of jaw injuries under treatment. The chief trouble he thinks is nearly always with the mandible which is recognized as being the most used bone in the body. It is more liable to serious damage in consequence of its exposed position, its loose attachment to the skull and the action of powerful muscles and the displacements also tend to be relatively greater than in other bones of the body. The mere use of bandages and other external appliances seldom avails to correct this deformity. He suggests the division of these cases into the six following types:

1. Fractures of the mandible without displacement of the line of occlusion.
2. Single fracture of the mandible with lateral displacement.
3. Single fracture of the mandible with vertical displacement.
4. Two or more fractures of the mandible with loss of substance.
5. Gunshot wounds of the maxilla.
6. Fractures involving loss of the anterior portion of the mandible or the maxilla or the whole of one side together with the soft tissue adjacent.

These types are fully described and numerous illustrative cases cited. In answer to the question: At what period after the injury should the aid of the dental surgeon be called in? he answers:

I should emphatically say that it should be done as soon as possible after the wound has been inflicted and I believe that there should be co-operation between the general surgeon and the dental surgeon the dental surgeon beginning his work immediately after the patient has recovered from the condition of shock. Efficient drainage is the first essential principle of treatment. Skilgrams should be taken at the commencement during and at the conclusion of the treatment. Teeth should be freed from tartar blood and food. Carious teeth should be temporarily filled septic roots and teeth should be extracted as soon as possible and any tooth that is situated in the line of fracture usually has to be sacrificed or union may be delayed. The application of a splint should follow as soon as it can be borne by the patient often the temporary appliance may be replaced by a permanent splint when conditions look more favorable. In displacements of the maxilla support may be obtained by

simple bandages or by means of suitable appliances. After sepsis has been controlled the next important step in the treatment is to restore what may remain of the masticatory apparatus by bringing back the fragments of bone into a position which permits of normal occlusion. The treatment may be divided into the four following stages:

1. Reduction of displacement of the fragments.
2. Retention of these fragments in the position which allows of normal occlusion.
3. Reduction of cicatricial contraction the restoration of muscular equilibrium and the remodeling of the facial contour.
4. Fitting of a permanent prosthesis upon the implant the better solution is still uncertain.

The aim of prosthetic treatment should be (1) to correct the deformity and (2) to return the teeth to the position of normal occlusion. To retain the fragment in the position until union has occurred (3) later some form of denture may have to be fitted to make good the gap left by lost bone and teeth and to restore the functional activity of the jaws. The idea that an interdental splint at an early stage will tend to promote sepsis he believes to be entirely erroneous. During the third stage of the treatment frequent massage both manual and electrical by competent nurses should be adopted to restore muscular equilibrium and care should be taken to guard against cicatricial contraction.

HAYES states that no pathological problems or conditions have been met with in this work the difficulties encountered being due to the variety and complexity of conditions presented which demand the most careful consideration. The principal treatment in these cases he believes falls upon the dental surgeon and the ultimate success depends upon the building up and restoring of the jaws as a skeleton or framework upon which the final plastic operation is performed. Much has been done but much remains to be done to supplement the special centers already created for this work in France. There should be dental surgeons at the front to give first aid to these cases and to decide what remaining fragments of jaws and teeth shall be saved and what removed. There are many questions involving the treatment of these wounds now undergoing renewal and general study.

Horz also ventures the opinion that in all jaw cases combined with extensive destruction of surrounding tissue the general surgeon should call the dental surgeon into consultation. He is in favor of simple rubber splints in most cases with the exception of those few in which the steady maintenance of fragments is indicated and he objects altogether to maxillary wiring as this creates a risk of ankylosis being set up. If pressure from the outside is necessary he employs linen bandages or special chin-cups of rubber or metal with hoops fastened together from the attachment of elastic bands that will allow pressure in the direction indicated by the case. He believes that a good method

od of procuring hygiene of wounds in the oral cavity is to suspend receptacle, fitted with a rubber tube and glass cannula, above the head of the patient to fill it with a light tepid solution of from 5 to 10 per cent iodine or chloride of sodium, and to wash out the cavity thoroughly from three to six times a day, according to the septic condition present.

COLYER follows with a brief description of the result of his experience in connection with the Croydon War Hospital. There are one or two main points in connection with the treatment in this hospital of which he speaks. As soon as the patient is admitted to the hospital, a peroxide mouth wash is given every two or three hours, and a 2 per cent solution of iodine is applied once every day. Skilograms are obtained and short notes made. The patient is then taken to the operating theater and given a general anesthetic, usually chloroform. When attempts are made to reduce the various fractures, the septic root is removed as well as the teeth in either side of the fracture. This is a universal rule throughout the hospital. The next step consists of the adaptation of splints, the fixation of which is generally left for two or three days or until there is a certainty that all sources of sepsis have been removed. When the patient is practically convalescent and the fracture is completely healed, a retention splint is inserted also before going back to the front. These soldiers are put through a dietetic course. Before they leave the hospital, they are changed from a liquid diet to a minced one, then to a boiled diet, and lastly to a roast diet.

Colyer believes that the most important displacements in the treatment of jaw cases are those that occur when there is a fracture in the region of the last molar tooth. Very often there is involved loss of tissue to the extent of one-half to three-quarters of an inch. The splints he uses are very simple, one of which he refers especially is known as the skull and mandible splint, consisting of a metallic splint moulded to the outside of the mandible in a knitted kullcap. Ununited fractures are usually due to the presence of a foreign body between the fragments, and secondly to a lack of rest, the foreign body usually being a tooth. Sinuses in connection with fractures of the jaw are, in majority of cases, due to septic teeth. Scar tissue is cut away freely from the jaw and forcible stretching of the soft tissue by means of plugs of vulcanite is adopted.

Stiff jaw, in which the scars have to be stretched is treated by using continuous stretching over a definite period. He has done bone-grafting in two cases, both successfully.

Six FREDERICK EYE believes that the ideal method of bridging over gaps in the mandible is transplantation of bone. This operation is rendered very much easier if splints are firmly cemented to the teeth across the gap. He has transplanted a portion of the eleventh rib. He has not as yet seen a case in which plating in gunshot fractures of the mandible seemed advisable.

HAYES states that the treatment may be divided

into two main stages: (1) the correction of displacement and support of fragments while the healing of soft tissue and bony union is taking place; (2) the fitting of some prosthetic apparatus for the replacing of lost parts, restoration of the function of mastication, possibly also of speech—and reduction of disfigurements. The interval between these two stages should be devoted by the patient to the stitching of the soft tissue and the massage of the voluntary hands that may have formed during the healing of the soft tissue. He believes it important that the splints be simple and aseptic in design and applied in a manner which will avoid the damping of discharges.

MURRAY refers only to the methods dealing with missing portions of the mandible where large or middle portions of the arch have been destroyed, leaving a gap. He is optimistic. Where large portions of bone missing, artificial restoration, he believes is the only course possible in the majority of instances, where a portion extending one-half or three-quarters of an arch are missing, he believes that osteosynthesis will take place in the great majority of cases. He does not believe in the old method of bringing the fractured ends together by wiring them, although he believes that it requires a longer period to obtain a firm bony union across the gap than does when the ends of the fragments are in contact.

NATHAN HAYES views as to plastic operation being performed without consultation with the dentist. He presents the photograph of one patient who had his right maxilla fractured and the mandible in four places with loss of bone on the right and no remaining tooth. The posterior fragment of the occlusion being maintained here by intermaxillary attraction, until a permanent pharyngeal denture can be inserted with reasonable prospect of success. He has also designed a temporary cap splint which is uncemented, has the front cut away, is easily removable, being ligated to three or four teeth, round loops on the lingual side and round vertical wires on the buccal side.

BROWNE says that his experience does not lead him to subscribe to the views of Colyer that the chief thing to seek is bony union even if there should result some lack of normal occlusion. In regard to apparatus, he is in favor of removable rather than fixed splints.

COLYER also dissents from the views held by Colyer on the question of occlusion versus union and believes, as does Hayes, that the presence or absence of a single tooth on a fractured portion may suffice to change the method of treatment entirely, and further he believes that conservation of one or two particular teeth will render relatively easy what would otherwise be a task beset with difficulties. So strongly is he convinced of this, that he has had root treatment carried out on the operating table. He believes, most emphatically, that early reduction and retention of fragments in jaw injuries are effectual

means of combatting sepsis and add materially to the comfort and well-being of the patient. He also thinks that the dental surgeon should be a skilled technician that he should be willing to make his services subserve the immediate and anticipate the ultimate requirements of the surgeon and he believes that the surgeon should have a working knowledge of the range and extent of the dental surgeon's possibilities and that he should know and make known his requirements.

BENNETT believes that in all cases of surgical work on the jaw care should be taken to preserve every tooth that is taken out so that, in peace times they may be examined carefully.

JAMES has found that where there is contraction of scar tissue pressure can be obtained from a length of rubber tubing introduced into the mouth in such a manner as to bring pressure upon the contracted tissue quite thin tubing is used at first and the heavier rubber introduced later. Pressure is obtained by an arrangement of the tube in a U form and it may be increased by tying the two free ends together to form an oval.

PEARCE agrees with Payne and emphasizes the four points with which the latter concludes. He regrets that the authorities have allowed these cases to go six or eight months before referring them to the dental surgeon.

TURNER finds that Dakin's solution is extremely useful in these cases of sepsis. He agrees with the other speakers in the use of cemented splints, especially where there is a possibility of having to remove them in order to extract a root. Regarding the loss of bone he agrees with Mummery. He thinks that all metals used in bone repair are apt to work loose subsequently. Where the cicatrix is once stretched a return may be prevented by the exertion of a small amount of force applied daily.

CARTER believes that wire suturing of the jaw causes fixation at once and is followed quickly by osseous union. He is in favor of silver plated copper wire (No. 10-BWG), and a special key for twisting it up as well as a flexible needle for returning the wire. The drill must not be revolved too rapidly or advance too quickly or necrosis will be caused by heating. A small rubber tube to protect the lips is put over the twisted ends of the wire before being turned down or a thin strip of rubber dam may be wound round them and the two ends tied.

EMIL C. ROBITZEK

Rico 1: Calculus of Wharton's Duct (Calculos del canal de Wharton). *Rep d med y c* Bogotá, 9 6 vil, 343.

Calculus of Wharton's duct is of relatively rare occurrence. The author reports a case in a man of 30. Thirty years previous he had had acute pain in the left submaxillary gland followed by inflammation. Recently the pain reappeared in this region accompanied by fever etc followed by genuine salivary colic and abundant discharge of saliva and pus.

By palpation a hard mass was located in the direction of Wharton's duct and the diagnosis of a calculus was verified by passing a sound. The patient would not permit an incision to be made. Later on the calculus perforated the mucous lining and appeared in the mouth. The abscess rapidly disappeared.

W. A. BELLMAN

Gulbé: Cranial Wounds in War Surgery. *Cand r* al ns u l's plan lu bur d guerre) P s m d 10 p 5

In fifteen months Gulbé has observed 3 cranial injuries of which 23 have been trephined. In the other 14 cases intervention was useless. They all died within 12 hours of their arrival.

As regards the evolution of such injuries Gulbé emphasizes the frequency of cerebral hernia after intervention for penetrating wounds with dura mater injury, also the frequency of encephalitis and the rarity of meningitis.

Non-penetrating wounds in general heal, penetrating wounds on the contrary are almost always fatal. Frontal region injuries are generally more benign than parietal.

Early intervention is necessary. If there is no functional trouble and no evidence of a lesion of the dura mater it is better to abstain from opening it. To prevent cerebral hernia recourse should be had to repeated lumbar punctures, but it is even better to make an early and sufficiently large trephination.

W. A. BRYMAN

Schmidt P: Pneumococcic and Meningococcic Meningitis After Fracture of Base of Skull (Pneumokokken und meningokokke Meningitis na h Schädelbasisfraktur). *Deut he med W k sch* 9 6 Jul 24

Schmidt reports an interesting case of meningitis with double infection by pneumococci and meningococci. The patient, a workman, had suffered a fracture of the base of the skull and was removed to the hospital seven days afterward. He died the next day. Bacteriologic examination of the spinal fluid made on the date of his entrance to the hospital showed pneumococci and meningococci in approximately equal quantities. The blood examination showed only pneumococci.

Autopsy showed a fracture of the upper part of the sphenoid and ethmoid fissure. The dura mater was not injured. Blood-clots and mucus were found in the sphenoidal sinus, the mucosa of the superior nasal cavity was tumefied and inflamed. There was no inflammatory process in connection with the ethmoid and sphenoid. The lungs showed on both inferior lobes bronchopneumonic multiple foci of three or four days' formation.

That the infection of the meninges in this case was direct from the inflamed upper parts of the nasal cavity either through the ethmoid fissure or that of the sphenoid and therefore by the lymphatics and not by the blood seems to the author not to need demonstration. If the infection had been

through the blood it would be natural to expect that this would have shown the presence of meningococci as well as pneumococci. W. A. BRENNAN

Kapocy J. P. Thyroid Tumors of Bones, with Special Reference to Non-malignant, Pulsating Tumors of the Skull. *Surg Gynec & Obst* 19: 6 xxi, 679

The author reviews the literature on thyroid tumors as found in bones and gives a brief résumé of cases thus far reported. He describes in detail a case coming under his own observation. As a result of his study he concludes:

1. That from the literature the majority of investigators conclude that primarily all metastatic thyroid tumors are histologically benign.

2. That metastatic tumors could result from small particles of thyroid tissue which have found their way into the circulatory apparatus.

3. That in many cases of thyroid metastasis there is no hypertrophy of the glands or apparent pathological condition.

4. That the malignant character of some of these tumors is due to some secondary infection possibly engendered by the thyroid cell acting as a focus of continued irritation.

5. That the deposition of embryonic thyroid cells is tenable and may be the greatest factor in the production of thyroid metastases, but the growth of such cells outside of its direct environment is made possible by some peculiar systemic condition as yet unknown.

Leopold S.: Circumscribed Purulent Leptomenigitis Due to Frontal Sinusitis. *J Am Med Ass* 9: 6 April, 1916

Two cases are reported. These cases, as well as a study of the literature, show that the symptoms are frequently preceded by weeks or even months of nasal catarrh with frontal headache or they may occur after only a few days following an attack of influenza. Edema and discoloration of the eyelids, with tenderness over the orbit frequently precede the cerebral symptoms when disease of the wall of the sinus or orbit is present. Frontal headache is present in nearly all cases, though pain in the head is not limited to that region. The pulse and temperature are not characteristic. Rigidity of the neck and Kernig's sign, though noted in both the cases reported are not frequent symptoms. Paralytic symptoms are noted usually in a later stage of the disease. Irritability and restlessness, alternating with clouding of the sensorium, are sometimes the only meningitic symptoms present and death sometimes comes before the development of paralytic symptoms. The pure meningitis following frontal sinus disease is less frequent than brain abscess, but much more frequent than thrombophlebitis.

The explanation of this phenomenon depends on the route of infection which may be direct, through the interstices or necrotic walls, or indirect, through

the venae perforantes of the sinus and orbit or through the lymphatics.

It seems that in many cases the dura escapes involvement that incision is necessary in all cases in which absence of lesions on the surface is noted. This holds true not only for the meningitic cases, but also for the subdural and frontal lobe abscesses. EDWARD L. CORDELL

Hartmann, H. Cranial and Craniocerebral Wounds (Plaies crâniennes et crâno-cérébrales). *Bull. et m. m. Soc. de chir. de Par.* 9: 6, 1915, 1916.

Hartmann's observations are based on 159 cases reported by different operators. Of the injuries 60 per cent were in the parietotemporal region, 18 per cent in the frontal region, 18 per cent in the occipital region. In 13 cases there was a complete fracture of the skull and in 85 of these the dura mater was involved.

The prognosis of cranial injuries by gunshot is grave and varies not only with the intensity but also with the site of the lesion, temporal lesions being the most severe, parietal, frontal and occipital following in severity in the order named. The last gives 100 per cent recovery. W. A. BRENNAN

Villaret M. and F. Uria-Bon. Les Traumatismes de la Tête Apparus dans les Craniocérébrales Wounds of War (Les lésions graves d'apparition tardive des lésions de guerre crâno-cérébrales). *Bull. et m. m. Soc. méd. et chir. de Par.* 9: 6 April, 1916

The authors give particulars of 37 cases of cranial wounds out of a total of 256 which have presented grave accidents appearing several months after the trauma. These cases are classified under four headings: (1) late epilepsy, (2) grave mental troubles, (3) meningeal infection and abscess of the brain, (4) late brain hernia.

Mental troubles and late cerebral hernia are exceptional. The most frequent and important results are late epilepsy and suppurative meningo-encephalitis. Meningitis and suppurative encephalitis were noted in four cases appearing from two to eight months after the trauma. The study of these cases has shown the important part played by the persistence of foreign bodies and metallic debris in the lesion. In the case of late epilepsy it is most interesting from the point of view of the lapse of time after the trauma. In one case this extended to thirteen months but most often it oscillates between four and ten months.

Most of these cases have been trephined for the primitive injury.

The practical conclusions which the authors draw from their study of the cases are that in the case of men trephined or presenting traces of craniocerebral traumas, the future prognosis must be reserved even in the absence of flagrant symptoms of central nervous lesions. Systematic radiologic examination of the cranium should always be made to discover metallic debris or osseous particles.

these are foci which provoke late grave results. Such men should not be returned to the front but kept at duty in the rear under medical supervision.

W. A. BRENNAN

Sharpe, W.: Observations on the Diagnosis and Treatment of Brain Injuries in Adults. *J. Am. Med. Ass.* 1916 lxxvi 1536

The author believes that the mortality of brain injuries in adults has heretofore been high (46 to 68 per cent in all cases) because patients have been allowed to reach the dangerous stage of medullary compression. The signs and symptoms giving warning of increased intracranial pressure and resulting medullary compression are carefully discussed and the importance and value of frequent observation regarding pulse, optic discs, intraspinal pressure and the presence of blood as noted by lumbar puncture repeated if necessary are pointed out.

In a series of recent brain injuries, chiefly fractures of the skull, operation was performed on 79 with only 14 deaths. Operation in the presence of shock with a pulse rate of over 120 is absolutely contra-indicated.

While valuable for diagnosis, lumbar puncture should not be used for the purpose of lowering high intracranial pressure for fear of medullary choking in the foramen magnum.

X-rays are of little importance in the treatment of fractures of the skull.

As regards late results of untreated fractures of the vault or base, the author looked up a series of cases and found 67 per cent were still suffering from the effects of the injury.

The common complaint was headache on exertion. Other symptoms were vertigo, irritability and epileptiform spells, the patients often being disqualified for employment. Of these cases, 4 per cent had had a pulse rate below 70 following injury.

The author believes the late results are due to an increase of intracranial pressure for a long period. Treatment in the majority of cases with increased intracranial pressure should be early decompression. All compressed fractures of the vault should be elevated or removed for fear of later complications. Palliative treatment may assist in bringing about recovery in milder cases but the large proportion require operative relief of the increased intracranial pressure due to hemorrhage or to the increase in amount of cerebrospinal fluid sufficient to produce a wet, oedematous, swollen brain.

In post-traumatic conditions due to long increase of intracranial pressure a large percentage can be improved by operation. The operation of choice in both selected acute and chronic cases of brain injury is subtemporal decompression. The author recommends a straight vertical incision from zygoma to parietal crest and longitudinal splitting of the fibers of the temporal muscle. This gives better hemostasis and union of the divided muscle.

HORACE BIRNEY

Grey E. G.: Studies on the Localization of Cerebellar Tumors — the Pointing Reaction and the Caloric Test. *Am. J. Med. Sci.* 1916 lxxvi 103

The records of 31 cases of cerebellar and extra-cerebellar tumor are discussed relative to the importance of the pointing reaction (Barany) and of the caloric test.

The situation of the growths in the 31 cases was as follows: 3 in the vermis, 10 in the hemisphere, 5 involving the entire cerebellum, 8 cerebellar pontine and 1 extracerebellar.

Concluding that the caloric test has proved to be an important means of differentiating labyrinthine from intracranial disease. Together with the pointing reaction, this test has been found of value in localizing circumscribed lesions in the cerebellum.

In most patients having tumors in the cerebellar-pontine region, new growths and in certain of those with tumors of one or the other hemisphere, the reactions were sufficiently characteristic to be of supplementary value in localizing the disease. In other patients with intra- or extra-cerebellar tumors, the results were often ambiguous at variance with other physical findings and had great reliance been placed upon them, would have led to erroneous conclusions.

There are probably a number of factors responsible for an atypical reaction in patients with cerebellar tumors, among which are: (1) greatly increased intracranial pressure due to internal hydrocephalus, and (2) the diffuse nature of many of the tumors common to the cerebellum. D. L. DESPARD

Livierato Spiro and Cosmettatos G. F.: Tumors of the Hypothalamic Region of the Middle Brain. (*Sui tumori della regione ipotalamica del cervello medio*). *Riforma med.* 96 III 449

Tumors of the hypothalamus of the brain comprise those which develop in the mamillary, hypophyseal and chiasmatic regions. Their development and the consequent compression not only provokes destruction of one of the regions mentioned but also of the nerves which traverse the base of the cranium in the neighborhood of the hypothalamic region and thus produce multiple cerebral phenomena. The symptomatology varies according to the point primarily attacked and the more or less rapid progress of the tumor.

The authors report in detail a case of psammoma of the hypothalamus in a woman of 37. In addition to general and nervous symptoms, the patient showed marked special sensory symptoms. There was complete loss of smell on both sides, also atrophy of the papilla of the optic nerve, both left and right, followed later by amblyopia of the left eye with persistent intense pain. A cerebral tumor was diagnosed and a trepanation done in the right temporal region, but nothing of importance was discovered. The woman died in coma six days after the operation. The tumor was demonstrated at autopsy.

In reviewing the literature concerning the frequency of tumors of the perichiasmatic region the authors find that in the case of tumors developed in the meninges, into which category their own case falls, only three such cases have been reported. They state that the case reported by Hefenrichdorff and their own case constitute a special category, i.e. that of psammomata of the perichiasmatic region, and that these two cases are the first reported up to the present time.

From the anatomoclinical study of their and other cases the authors find that the monolateral involvement of the optic nerve first observed and accompanied by anisometropia fixed the location of the tumor at the anterior angle of the chiasma. This anisometropia which is due to a destructive compression of the perforated anterior subarachnoid space or of the optic nerve has a great diagnostic value particularly when no other nerve besides the optic is involved. The compression or destruction causes degeneration of the nerves of Lancelotti which unite the peripheral and central olfactory apparatus.

The authors claim that craniopharyngeal tumors may develop and attain great size without the hypophysis itself being clearly attacked or disturbed in its functions.

W. A. BAXTER

Carter, M., and Cost, S. Adenocarcinoma of the Cerebellum (Adenocarcinoma del cerebello). *Progr. med. Argent.*, 9 6, No. 30, 30

The author describes the case of a man 3 years old, who had been ill for six months with violent and continuous headaches, localized in the anterior part and right side of the head. He vomited without initial nausea and without the slightest loss of food. At times, nausea was so intense as to interfere with his standing or walking, and he had manifestations of falling on the left side. The patient was constipated. Reflexes, pulse, Romberg, lungs, pupils, etc. were all normal. The urine and blood were negative. Lumbar puncture gave out liquid with normal tension, and flowing drop by drop clear. Apfels and albumin reactions present. Wassermann negative. Lymphocytic sediment.

The patient received bichloride of mercury (0.01 to 0.02 cc) daily intravenously and 4 to 6 gm of KI, daily. His symptoms diminished in intensity for the first week. From the fifteenth day, however, the symptoms increased to such an extent that the patient could not move from his bed. His eyes were closed and he moaned continually. The cephalalgia became so extreme that the patient would take his head between his hands and scream in agony. The headache was no longer frontal exclusively but occipital as well. The position he would assume in preference was right lateral decubitus and pain was evident upon muscular pressure. Babinski sign was present on both sides. Deep and muscular sensations were present. The pupils reacted well, but were found to be unequal. There was left facial paresis in the region of the superior and inferior facial. There was bradycardia

and a depressed intellect. After another lumbar puncture which showed a tubercle bacilli in a positive Wassermann 90 per cent lymphocytes and 10 per cent polymorphs, the patient entered a state of continuous excitement and was unmanageable. Morphine treatment given in repeated doses. The symptoms continued unabated until a comatose condition ensued and death occurred several hours thereafter or about 1 month from the onset of the disease.

As to the diagnosis there were two possibilities: a tumor of the right frontal lobe, with cerebellar symptoms due to counterpressure and a cerebellar tumor in the right hemisphere. An autopsy confirmed the following findings. Dura tense and hyperemic. Cerebrum markedly congested. A macroscopic examination of the cerebellum showed that the entire right lobe and the isthmus were of gelatinous consistency. The border of the posterior margin of the right hemisphere presented a stratification of the circumvolutions, much less than in the left, though an increase of the meninges. A horizontal incision was made passing through the center of both cerebellar hemispheres and comprising the median cerebellar peduncles, also the dentate nucleus. Interesting changes were observed. An enormous mass occupied the posterior third of the right hemisphere and from it flowed a substance of an albuminous consistency, of yellow pinkish color leaving behind a series of cavities, few in number and of various sizes. The mass was of a heterogeneous aspect some parts compact others spongy some hard others soft of a mixed color. The dentate borders in some parts and diffuse in others infiltrating the nervous tissue in some parts, compressing and covering it entirely in others. Vascularly rich. Certain zones were easily emulsified, while the greatest portion of the mass was infiltrated and could not be emulsified. The anterior posterior diameter of the mass was 3 cm. transverse diameter 4 cm. vertical diameter 3 cm. The shape was more or less spherical. Its anterior part was smooth. The cortical substance of the cerebellum was not invaded. It was found compressed and crushed but not attached to the tumor.

A histological study of the tumor showed it to be a tumor of carcinomatous type with cylindrical cells, of the form known as adenocarcinoma. The neoplastic cells showed extreme proliferation. Apparently there was no relation of contiguity or continuity between the carcinoma and the fourth ventricle, whence epithelial plexus could have originated. The cylindrical type of the adenocarcinomatous cells have probably a direct or indirect relation to the ventricular ependyma.

RAOUL L. VIGORAN

NECK

Gelst, G. A. Congenital Cysts and Fistulae of the Neck. *St. Paul M. J.* 9 6, xviii, 57

The author insists that congenital cysts and fistulae of the neck must be divided into two groups,

according to the embryologic origin of each. (1) median and (2) lateral cysts and fistulae. He then takes up the subject of median cysts and fistulae and gives the theories of their origin as outlined by the works of Streckhausen and Hiss.

The views of Wenglowski as published in 1912 are quoted. The site of the opening depends greatly upon the size of the cyst and upon the attachment of the cyst wall to the skin due to inflammatory processes. Cysts are usually irregular in shape projecting into the connective tissue and if ruptured the resultant fistula is tortuous making the passage of a probe difficult. Injection of colored or flavored liquids to determine if possible the communication with the foramen cecum is usually futile unless pathological rupture into the mouth has occurred.

A patient aged 21 years presented a subhyoid median, fistulous opening. Diagnosis was made after an injection of bismuth paste and X ray. Total extirpation of the walls of the cyst was performed with good results.

Lateral fistulae are classified as complete and incomplete and the latter divided into incomplete internal and incomplete external fistulae. The complete occurs in the young or is present at birth but the cyst formation occurs in later life. Fistulae are found more frequently on the right side and are rarely bilateral the external openings are usually single. The secretion is a mucous fluid clear or turbid the amount varying from a few drops to an almost continuous flow.

The caliber of the canal is so small that the finest probe is passed with difficulty or so large as to allow the passage of food particles from the pharynx. Injection of fluid will establish a diagnosis of complete or incomplete fistula. The diagnosis of lateral cysts is not so easy as in the case of fistula.

Geist believes there are two methods in the treatment of cysts and fistulae of the neck. (1) Injection of irritant drugs into the fistula or cyst. (2) total extirpation of the cyst or fistula wall, the latter being the better.

Two cases are reported. One case was a girl of eight years who presented two small openings midway between the chin and the clavicle over the sternocleidomastoid muscle of the right side. The other was that of a woman of thirty years who presented a vertical scar two inches in length in the middle of the border of the sternocleidomastoid muscle, and in the lower end of the scar a small, pin point opening was present. Both were operated upon with good results.

EMIL C. ROBITZKY.

Begoun: Results in Seventeen Cases of Neck Resection in the Secondary Period of Traumatic Arthritis (Résultats de dix-sept cas de résection du coude dans la période secondaire de l'arthrite traumatique). *Bull. et Mém. Soc. de Ch. et Par.* 1916 XLII, 803.

Begoun points out that the enthusiasm of Leriche and other partisans for immediate or very

early resection of the neck in cases of arthritis should be tempered and that the advice of Quenu should be followed who urges that there be further observations before coming to a definite conclusion in the matter.

Begoun gives the results of 17 cases of resection of the neck in cases of arthritis caused by projectiles in which operations have been performed by different surgeons and in which Begoun has had the opportunity of judging the end results which are quite deplorable. Of the 7 cases the neck is unbalanced in 15 and the forearm is not even after effort in the other two the arm is somewhat better but still the patients cannot raise anything to their mouth nor button their clothes.

Begoun thinks that the good results reported have occurred in the case of surgeons who were specially familiar with this resection and were able to devote sufficient time for personal supervision of the after treatment which is most important.

In the hands of the average surgeon he thinks the results will not be better than those reported and he is of the opinion that interference by resection in the secondary period will not give as good results as would be obtained by allowing an ankylosis to be established in good position. Large arthrotomy incisions lavage of oxygenated water curette etc. should be the treatment which will either effect a recovery or leave an ankylosis.

HARTMANN QUENU and BROCA discussed the paper and the general opinions expressed seemed to favor Begoun's views with certain reservation.

W. A. BRENNAN.

Bell & J. Prolonged Use of Tubes Following Diphtheria. *Arch. Pediatr.* 1916 V, 61.

The patient aged one year was suffering from laryngeal diphtheria with a history of having been sick about two weeks. The child was decidedly toxic temperature 103.2 pulse 140 or more and the respirations of the Cheyne Stokes type. There was marked retraction of the chest wall upon inspiration. No membrane was visible upon the tonsils or pharynx. A dose of 20,000 units of antitoxin was injected into a vein and 5,000 into the thigh. The respiratory failure was due to the general toxæmia. On attempting intubation, the patient ceased to breathe and went into profound collapse. The pulse could not be felt nor the heart sounds heard and for several minutes the child appeared to be dead.

A low tracheotomy was done artificial respiration performed and stimulants given. The patient finally began to breathe, at first with only mechanical gasps due to the manipulations and then by the return of the pulse. After breathing began, sufficient air entered the lungs, but a most distressing cough kept up for half an hour or so. This was immediately relieved by allowing two or three drops of a 2 per cent cocaine solution to run down the tube. Steam inhalations and tent were used from the start. For several days rectal feeding was resorted to because of the tendency to choke. On the fifth day a very slight amount of air entered

through the larynx when the opening of the tube was closed. On the seventh day the tube was removed for fifteen minutes. Although some air entered through the normal passage nearly all the breathing was through the opening in the neck.

On the ninth day 50,000 units of antitoxin was given on account of the large edematous swelling of the fauces, which mechanically interfered with feeding. This condition improved the following day. Between the ninth and the twenty-first day there was no change in the tube situation. On the twenty-eighth day the child's temperature was normal for the first time. On the twenty-ninth day the patient's general condition was excellent. The finger was placed over the opening of the tube and a sudden pressure applied to the chest wall with the result that the child uttered a dull cry and

coughed several times. This was successfully repeated every few minutes for half an hour. On the thirty-first day the tracheotomy tube was removed permanently and the child had no further difficulty in breathing through the larynx.

Without warning or physical signs to account for it two days later the child developed a subnormal temperature and typical Cheyne-Stokes breathing. On the thirty-fifth day 50,000 units more of antitoxin (making in all 65,000 units) was given. At this time the throat cultures were still positive. After this further progress was uninterrupted. There were no paralytic signs of any kind. Phonation was normal and the child was discharged in excellent condition after having been in the hospital for two months.

EDW. ED L. CORNELL.

SURGERY OF THE CHEST

CHEST WALL AND BREAST

Durante, L., and MacCarty W. C. Tuberculosis of the Breast. *A. Surg. Phila.* 9: 6 Jan 1908

The authors have observed 10 cases of tuberculosis of the breast. In 3 of them no primary focus was clinically demonstrable. In 3 no clinical tuberculous lesion except the axillary lymphatic involvement was demonstrable, in 1 there was an associated pleurocostal lesion, and in 3 there were evidences of pulmonary tuberculosis.

From a review of the literature the following seem to be the important points in the disease.

The period of greatest susceptibility is between the twentieth and fortieth years. A total of 80 cases have been reported.

Although there is no apparent relationship between the two diseases, 7 cases have been reported in association with neoplastic processes.

3. Practically every case is secondary to a primary focus elsewhere in the body, although infection by way of abrasion in the skin is possible.

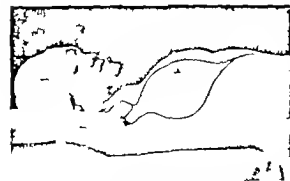


Fig. Showing the line of incision. (Jennings.)

4. Most observers have considered the blood stream to be the most common route of infection, though in certain cases the organisms were apparently carried entirely from the neighboring lymphatic glands.

5. A microscopic diagnosis is essential in practically all cases although other means such as cultures, smears, and guinea-pig injections should not be overlooked. GATKHO.

Jennings, J. E. Cancer of the Breast. *N. Y. M. J.* 9: 6, Aug 1900

The author emphasizes the necessity of early diagnosis and operation and points out that 76 per cent of breast tumors in women over thirty years of age are malignant. 11 cases under that age less than 10 per cent are malignant.

The examination of the breast should be thorough. Cancer is more common in the upper quadrant under the nipple and on the outer side. Benign neoplasms occur more frequently in the inner quadrant. Flattening, retraction of the nipple, or shortening of the radial axis is suggestive of carcinoma, especially scirrhus, which causes contraction of the suspensory ligaments of the breast, elevating the affected nipple an inch or more. In late cases when the skin itself is infiltrated, difference in color may be seen or the orange or pig-skin pitting will mark its appearance or chronic eczema with discharge from the nipple.

If the clinical diagnosis is not conclusive, the breast should be explored and the diagnosis made from the gross examination or from frozen sections.

The essentials of a radical removal of the breast is a wide skin incision with a wider removal of the deep fascia, the pectoralis major, minor, axillary fat, and lymphatics. The fascial removal should reach below the areola and the epigastric triangle of Handley. The supraclavicular glands should be



Fig. 2. After the breast has been removed (Jennings)

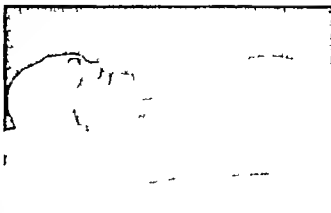


Fig. 3. Bowel suture line (Jennings)

removed when the growth is in the upper or inner part of breast

Illustrations show the incisions that Jennings has found useful.

D. L. DESVARD

Lenormant, C. Some Observations Regarding the Removal of Projectiles by Thoracotomy (Quelques observations de projectiles lésés par thoracotomie) *Bull et mém Soc de chir de Par* 1916 44, 57

The author reports 8 cases of removal of intra-thoracic projectiles by thoracotomy and the particular point to which he draws attention is the advantage of large pleural openings. He thinks the procedure of choice is the resection of a single rib for a distance of 10 or 12 cm. This can be done bloodlessly in a few minutes and without any ligation being necessary later.

It gives ample opportunity to palpate and examine the thoracic cavity to expose a pulmonary lobe if necessary to approach the mediastinum and to raise and incise the diaphragm.

After operation a few sutures of the soft parts of the intercostal spaces will hermetically close the thoracic breach.

The large opening of the pleura has never been the cause of any accidents in the author's practice. For a long time he insisted on the harmlessness of operatory pneumothorax, and he thinks that recent experience in intrathoracic surgery has confirmed this opinion. The fear of opening the pleura should be dismissed from the surgeon's mind. Under a rigorous asepsis the operations can be done in the thorax just as in the abdomen.

The majority of Lenormant's patients have had a total pneumothorax. None has shown the least respiratory or circulatory incident. If there should be some irregularity of respiratory movements on the entrance of the air traction of the lung will restore order.

In this procedure no drainage is indicated. Resorption of intrapleural air is so rapid that he has not found it necessary to aspirate it.

The cases reported by Lenormant comprise 3 intrapulmonary foreign bodies and 2 foreign bodies

of the mediastinum, one in front of the posterior part of the sides, the other being situated behind the pericardium at the depth of 13 cms.

A sixth case, that of a projectile included in the thickness of the diaphragm. In a patient recently operated upon Lenormant has extracted by transpleural and transdiaphragmatic laparotomy a bullet situated in the convex face of the liver.

W. A. BRENNAN

Burk. Extraction of a Piece of Grenade from the Pleural Cavity by Means of the Electromagnet (Extraction of a Grenade Splinter from the Pleural Cavity by Means of the Electromagnet) *Dtsch Wochenschr* 1916 42, 34

The question as to which should be preferred the operatory method or the use of the electromagnet for the extraction of portions of projectiles retained in wounds or in cavities does not admit of discussion. The operatory method is in the majority of cases the most secure, the easiest and the least dangerous. In the trachea, the esophagus and intrathoracic regions however in which operation is difficult or impossible extraction of the foreign body must be made generally by means of the electromagnet.

The case reported by Burk was that of a soldier who in addition to a gunshot wound had two punctured wounds about the level of the tenth right costal. In the right thorax about the level of the middle of the scapula there was a very pronounced cutaneous emphysema. In the pleural cavity there was evident wheezing which extended to the angle of the scapula. Exploratory puncture was bloody. Resection of the tenth costal released about 500 ccm. of a foetid purulent bloody liquid with little particles of projectile. On recovery from this operation the patient was sent to a base hospital where it was found that the right lung was greatly collapsed and that the pleural wound gave a very foul secretion containing pyococcus micrococci. By means of a sound a fragment of projectile could be felt in the pulmonary pleura about 10 cm. from the operatory wound. The rigidity of the thoracic wall did not favor extraction of the

projectile by the ordinary operative method more over the patient a condition did not warrant further operative damage to the lung. The author therefore determined to endeavor to withdraw the fragment with the electromagnet. After some fruitless attempts he succeeded in extracting the fragment which was about 1.5 by 1 cm. in size. A few days after the extraction the suppuration ceased and within a few weeks there was a gradual extension of the collapsed lung. The patient improved and gained 25 lb. in weight though there was still some mastitis.

W. A. BARNES

TRACHEA AND LUNGS

Green, N. W., and LeWald, L. T. Foreign Bodies in the Respiratory Tract. 4. *Surg. Phila.* 916, 1911, 656.

Although Hippocrates inaugurated intubation of the larynx in order to relieve asphyxiation, very little of note in the treatment of foreign bodies in the bronchi was brought forward prior to the work of Killian in 1896. Since that time many laryngologists and surgeons have interested themselves in this pathological entity with the result that remarkable strides have been made both in diagnosis and treatment.

In the laryngeal portion of the respiratory tract the vocal cords constitute the lumen. In the ventricle of the larynx, objects frequently find lodgment. The next stopping place is at the level of the cricoid. The bifurcation of the trachea rarely arrests an object, as bodies small enough to pass the cords will slip into the bronchus. The right bronchus, from its size and position, is the one most frequently entered. The next point of arrest is in the epibronchial bronchus on the right or the hypobronchial bronchus on the left or in the trunk bronchus on either side. A small body may penetrate the divisions of the trunk bronchus into the various lobe bronchi and their subdivisions.

Foreign bodies may be classified as mineral, metal, or organic. Most mineral and metal objects are revealed by the X-ray. Some organic materials, such as pieces of bone, can be detected in the same way. The most dreaded objects, however, are the organic substances such as seeds and beans, which cast no shadow and which will rapidly

According to Bruening, 69 per cent of foreign bodies occur in children less than twelve years of age. The greatest frequency is at about two years of age.

All recently aspirated foreign bodies should first be sought by the X-ray and the bronchoscope without delay and removed if possible through the mouth. Should this attempt fail a tracheotomy should be done or another effort made by means of the bronchoscope. Failing in this also the wound should be held wide open by wires or by a large tube in the hope that the foreign body may be coughed out. If all attempts at immediate removal

fail, a period usually elapses during which the patient may develop secondary changes in the lung, such as pneumonia, gangrene, abscess and generally an overlying empyema. If he recovers from these acute infections he passes into the class of deferred cases, and removal of the foreign body in these deferred cases does not always effect a cure. The lung abscesses must be treated along surgical lines, and even then it is not always possible to effect a cure but only an amelioration of the affliction.

GATEWOOD

Canuys, G. War Injuries of the Larynx and Trachea (*Les blessures de guerre du larynx et de la trachée*) *J. de méd. & Bordeaux*, 9 8, 1911, 91.

Injuries of the larynx are comparatively rare in war. The statistics of military surgery of former wars show about 6 laryngeal for 10,000 wounds of other organs. In the present war Delorme has stated that wounds of the neck comprise about 3 per cent of all wounds and that wounds of the larynx and trachea are very rare. Gules found in 730 wounds of the head and neck, 17 laryngeal and tracheal. The larynx on account of its great mobility is able to protect itself from a projectile, but in case it is injured the man may die suddenly.

The most important class of injuries referred to by the author are penetrating wounds of the larynx, which have for after-effect a traumatic stenosis either circular or tubular. The treatment of these laryngostenoses consists either in tracheotomy, laryngostomy, tracheolaryngostomy or progressive dilatation. In the latter case after the intervention and insertion of the cannula, the cavity is left open. This cavity is packed above the cannula with iodoform gauze by means of a dressing. The dressing is replaced at the end of fifteen days or three weeks by a canouchou tube the caliber of which is progressively changed. This is open canouchou tube progressive dilatation. When the dilatation is judged to be sufficient, say at the end of five or six months for circular stenoses, twelve to fifteen months for tubular, the canouchou tube is suppressed and a tracheolaryngeal plastic operation is done which constitutes the last phase of the treatment.

W. A. BARNES

Silverstrial, L. Phrenicotomy in the Treatment of Sober Chronic Diseases of the Lung (*La frenicotomia nella terapia di alcune malattie croniche del polmone*) *Riforma med.* 916 xxxiii, 1910.

In recent years several surgical procedures have been suggested or practiced in chronic lung affections, particularly tuberculosis, such as thoracoplasty, artificial pneumothorax, and more recently the phrenicotomy proposed by Sauerbruch.

Silverstrial has made experiments on dogs to test the effects of phrenicotomy either unilateral or bilateral, on respiratory dynamics and on the pulmonary and diaphragmatic tissues. From his experiments he arrived at the following conclusions:

1. Unilateral or bilateral phrenicotomy in dogs is in itself sufficient to suppress lung movement in a practically useful degree.

2. In the early period other respiratory muscle power compensates for the deficiency of diaphragm movement.

3. In the later period this deficiency in the motility of the diaphragm is completely replaced (compensation of contralateral and surrogate innervations).

4. Neither in the early nor late period is it possible to observe any modifications of structure in the healthy lung.

W. A. BRENNAN

Villeon P. de la. Operative Extraction of Intra-pulmonary Projectiles (Extraction opératoire des projectiles intra-pulmonaires). *J. de méd. et de chir. Bordeaux* 1916 lxxvii 7.

In a total of 1,000 wounded which have come under the author's observation there were 80 penetrating wounds of the chest. A large proportion of these were carriers of intrapulmonary projectiles. For their extraction the author sometimes employs a thoracotomy with costal resection followed by pneumotomy and pleuropulmonary suturing consecutive to restoration of the wall, sometimes he extracts under the radioscopic screen following Maudsire's method which he has successfully employed for projectiles having a 10- to 12-cm. parenchymatous depth.

Comparing the procedures he thinks that extraction under the screen is an excellent method, truly marvelous in its simplicity, its rapidity and in the security which it affords. It only occupies a few minutes, sometimes only a few seconds. The patients are up by the fourth or fifth day and pleural and pulmonary rescues are trivial. He reports 20 successful operations 7 of which were performed under the screen.

W. A. BRENNAN

Binet, L.: Indirect Traumatism of the Lung Due to the Nearby Explosion of Large War Projectiles (Les traumatismes indirects du poumon déterminés par l'éclatement à proximité des gros projectiles de guerre). *Presse méd.* 1916 p. 3.

The author cites some illustrative cases to show that after shell explosions although there is no external injury, hæmoptysis of more or less gravity may be found in those who happen to be in the vicinity of the explosion. These sometimes may be very grave as in the case of a soldier dying some moments after a shell burst near him without an external wound and in whom an autopsy showed intrapleural hæmorrhages with rupture of the lungs and gastric hæmorrhage.

Regarding the pathogenesis of such hæmoptysis the author points to two theories: (1) the chemical which suggests pulmonary hæmorrhage due to intoxication and (2) the mechanical, an alteration in the pulmonary parenchyma by modifications of the atmospheric pressure. Both may occur in association. As regards the latter the hæmoptyses ob-

served in such cases are due to an atmospheric depression and are similar to those observed in aeronauts. But in some instances the full winged explosion may be due to impregnation of the udara of a quantity of air into the lung under a strong pressure may cause a rupture of one of the pulmonary vessels giving rise to the hæmoptysis.

W. A. BRENNAN

HEART AND VASCULAR SYSTEM

Silvan C. A Projectile Penetrating into and Lodging in the Heart (D'un projectile pénétrant et arrêté dans le cœur). *R. M. Chir.* 1916 p. 17.

Silvan reports the case of a soldier with a gunshot wound in which the projectile reached and remained in the heart. The surprising fact was that the functioning of the heart continued to be perfectly normal.

As to the manner in which the projectile reached its position it is not improbable according to Silvan that before becoming fixed in the atria muscle it reached the right ventricular artery where the X-ray examination located it following the direction of the large vessel. It is logical to think that it encapsulated and fixed itself in its position without effect or harm to the circulatory function.

W. A. BRENNAN

Villeon P. de la. Three Juxtacardiac Projectiles Extracted by Three Routes and Different Procedures (Trois projectiles juxta-cardiaques extraits par trois voies et par trois méthodes différentes). *Bull. Mém. Soc. Chir. P.* 1916 p. 90.

The three interesting cases reported by the author are as follows:

The first case was that of a long juxtacardiac projectile resting against the left ventricle and behind it. Extraction by the high thoracic transpulmonary route was followed by recovery.

The second case was that of a juxtacardiac projectile resting against the left ventricle and below it. Extraction by the low abdominal transdiaphragmatic route was followed by recovery.

In the third case there was a juxtacardiac projectile resting against the left lobe, exterior face. Recovery followed extraction under the radioscopic screen.

The three foreign bodies situated in the vicinity of the heart were extracted: one across the lung the second by abdominal route across the diaphragm and the third across the intercostal space under radioscopic control.

W. A. BRENNAN

Léclerc R. Ablation of a Foreign Body from the Heart Followed by Recovery (Sur un cas d'ablation de corps étranger du cœur suivi de guérison). *R. M. Chir.* 1916 xxxv 4.

Owing to the importance under the present-day conditions of the question of ablation of foreign bodies lodged in the heart, Léclerc publishes the

full details of a case operated by him three years ago in which he extracted a needle fixed in the left lobe of the heart of a child of nine years.

This operation shows that the ablation of a fixed foreign body is less difficult than it is thought to be and that no extensive parietal stripping is necessary. In the case alluded to he resected a costal cartilage and incised the two subjacent cartilages. The heart being exposed he felt nothing on the ventricles on the other hand above the auriculoventricular wall he easily recognized the needle in the lobe.

Holding the needle between his fingers he made a small incision, extracted the needle and sutured the wound. There was perfect recovery.

Leriche thinks that in the case of a bullet a similar procedure could be followed. In the case of a foreign body lodged in a wall, and particularly in a ventricular wall or even a sequestered foreign body in a corner of the cardiac cavity intervention can and should be attempted. The position can be clearly determined by radioscopia.

W. A. BRIDGMAN

SURGERY OF THE ABDOMEN

ABDOMINAL WALL AND PERITONEUM

Outland, J. H., and Clendenen, L. Phases of the Chronic Abdomen and of the Acute Abdomen. *Lancet*, 31 J. 9 6 xlvii, 337.

The authors show a few of the numerous pitfalls that beset the diagnostician in certain phases of the chronic and acute abdomen. Several cases are used as illustrations.

Quoting tables from Cabot's differential diagnosis the conclusion is arrived at that two-thirds of the abdominal tumors large enough to be easily palpated through the abdominal parietes are either uterine fibroids, ovarian cysts, enlarged gall-bladders, or gastric neoplasms, and that one-sixth of all such are either tumors of the ovary, intestines, or liver or tubercular peritonitis, or tumor of the spleen or malignant uterus.

The authors recommend these tables in the diagnosing of chronic abdominal conditions, acknowledging, however, their lack of accuracy.

In old people the flabbiness of the abdominal wall must be born in mind as there will be no rigidity in the presence of acute abdominal inflammation.

A résumé is given of a case diagnosed as tuberculosis of the liver owing to pulmonary lesions. Operation was performed and sections of the tumor seemed to resemble tubercular processes. Later on in other hands, the case was proved to be syphilitic.

In the acute abdomen there are no tables of causes and the diagnostician must judge by the symptoms and his experience.

It must be remembered that lobar pneumonia of the right lower lobe can produce pain, rigidity and tenderness in the right side of the abdomen simulating appendicitis.

In ectopic gestation, the symptoms before rupture are always diagnostic and combined with a vaginal examination of sufficient evidence warrant laparotomy.

A case is cited of an acute abdomen resulting from perforation of an old ulcer in the transverse colon following fecal impaction for eight days.

Another very unusual cause of acute abdomen is perforation of the gall-bladder. However, diagnosis of this condition is rarely made before operation.

A case is reported which was diagnosed as acute appendicitis.

The article closes with the warning that in acute abdominal conditions a cathartic should never be given and all food by mouth should be withheld.

P. M. CHASE.

Urbondo C. Serious Esophageal Spasms in Cancer of the Cardia of the Stomach (Espasmos esofágicos graves en el cáncer del estómago alejado del cardia). *Revista Méd. Argent.* 9 6, No. 30, 304.

Esophageal spasms are considered relatively frequent in certain forms of sensory motor gastric neurones, as well as in processes accompanied by these foci.

The author had two such cases which developed insidiously and manifested their violence by the complete transient severe spasm of the esophagus simulating in its evolution a process of complete stenosis of the tube. Some of the symptoms were a progressive dysphagia, mucous expectoration, profuse salivation, secondary inanition, etc.

Cancer of the stomach, in its cycle of evolution, may be local esophageal manifestations which may be confused with an organic process in the tube. In the majority of cases an examination with the sound will reveal the purely functional obstacle which will be confirmed by esophagoscopy.

Notwithstanding that all conclusions are only relative the author considers it important to make a minute physico-functional analysis of the stomach in individuals of certain age in whom there is found a spastic narrowing of the tube without a determinant cause, rebellions to antispasmodic agents and repeated catheterization. At times it is impossible to detect slow processes of gastric degeneration.

RAOUL L. VIGORAN

Quénu E. Extraction from the Abdomen of a Bullet Encysted in the Epiploon, a Year After the Injury (Extraction du ventre d'une balle de plomb enkystée dans l'épiploon, un an après la blessure). *Bull. et Mem. Soc. de Chir. de Par.* 9 6 xlii, 24.

Quénu exhibited a fragment of the great omentum enclosing a bullet. The man was wounded April,

1915 and was operated upon April 1916. In dissection was made under guidance of the Hirtz compass somewhat above the position of Jalaguier's incision. On introducing the finger in the abdomen the extremity of the epiploon was felt pursed and enclosing the projectile. The fragment was excised also the appendix. There was no adherence of the epiploon either with the abdominal wall or the viscera. The bullet had penetrated through the sacral region into the abdominal cavity without involving any viscera. The fluid contents of the epiploic cyst was not quite sterile even after the lapse of a year.

W. A. BRENNAN

Roulier. Note on 46 Wounds of the Abdomen by War Projectiles (Note sur 46 blessures à plaies de l'abdomen par projectiles de guerre). *Bull. et mém. Soc. d' chir. d. P. r.* 1916. Vol. 4.

Of the 46 abdominal wounds reported 31 were perforations. Of these, 4 died almost immediately after arrival at the ambulance and without any intervention. Of the 27 others 15 were operated upon and in 9 no operative treatment was instituted. Of the 15 operated upon 6 recovered and 9 died. Of the 12 treated by abstention 9 recovered spontaneously and 3 after a later intervention.

W. A. BRENNAN

Schwartz, A. and Mocquot, P. The Treatment of Penetrating Abdominal Wounds in the Ambulance (Le traitement des plaies pénétrantes à l'abdomen dans les ambulances). *R. e. de M.* 916. xxv. 36.

The authors submit this as a contribution to the question as to the course to be pursued in the treatment of penetrating abdominal wounds of war, i.e. whether to operate or to abstain.

The arguments advanced against operative treatment are of two varieties—scientific and military.

The scientific arguments are the tendency of such wounds to spontaneous recovery, the baneful influence of the shock and the bad results given by operation.

The authors find that spontaneous recovery of abdominal wounds with intestinal perforation is rare and in cases where recovery takes place it is very difficult to say whether or not there was a real intestinal perforation. In the absence of surgical intervention there is apt to be errors in diagnosing perforating wounds. The fact that certain simple penetrating wounds, or even in rare cases intestinal perforating wounds recover spontaneously is not a sufficient argument against operation. If it can be proved that laparotomy can cure wounds which would not have healed spontaneously.

As regards shock the authors think that the state of shock in which a wounded patient may be is not an absolute operative indication because they think that the best means of remedying the grave conditions which the site of shock indicates is to operate.

Against the third argument the bad results

obtained from operation the authors submit their own statistics. They have done 60 laparotomies for penetrating abdominal wounds. Of these 41 are dead and 19 recovered 31 died within three days after the operation. In these cases lesions were irremediable. Several had fully developed peritonitis they would have died without operation and they died in spite of it.

Of the 19 recovered 15 cases of bad penetrating intestinal wounds 7 had visceral perforations. Some of these might have recovered spontaneously but the greater part have been cured by the operation and the authors think that it requires no argument to show that laparotomy is the best treatment for abdominal wounds.

The argument of a military nature against operation are. The delay in arrival of the wounded, the difficulty of finding aseptic conditions, the length of the operation and the difficulty of handling hundreds of wounded arriving simultaneously.

The first two arguments are easily disposed of by good organization and equipment. The authors have not found it necessary to neglect others in order to perform laparotomy in an ambulance service. Moreover this procedure requires no more time than is required in a serious limb injury.

The indications for operation are discussed also the diagnostic principles, operative technique and operative prognosis. Short details of each of their 60 cases are given.

W. A. BRENNAN

Pfeiffer, D. B. Factors Influencing the Present Mortality of Peritonitis. *J. N. M. J.* 1916. Vol. 604.

With a detailed terminology the present status of peritonitis and its treatment and its influence upon mortality and morbidity is thoroughly and systematically dealt with. Emphasis is laid by the author on those peritonitis which have been analysed with the following findings:

Not purged before admission received 11 deaths.

Operated before admission 22 recovered 15 died 4.

No opiates before admission 4 recovered 14 died 3.

Food or liquid by mouth all

Int. rect. is none

Power or sitting posture none

The author protests against the stereotyped methods of treatment of abdominal pain and colic. The great pitfall for the practitioner lies in the fact that many abdominal pains are not due to surgical conditions and secondly in the difficulty of differentiating surgical disorders in their early stages from the lesser maladies. Until a very few years ago the purge was thought to be a very good introduction to the treatment of any disorder abdominal or otherwise.

When the practitioner learns to treat all cases of abdominal pain with masterly inactivity during the period of indeterminate diagnosis when he

does nothing that runs counter to the principles of treatment set forth when he calls a competent surgeon at the earliest indications for operative treatment, the mortality from the acute abdomen will approach the vanishing point.

EDWARD L. CORRYELL.

Quasella, B. An Interesting Case of Double Retrograde Strangulation (S. di un interessante caso di doppio strozzamento retrogrado). *Glor. d. Accad. di med. d. Torino* 9 3, Ixxviii, 38.

This very interesting and comparatively rare case occurred in a man who while working was suddenly seized with abdominal pains, nausea, and persistent vomiting. The attending physician diagnosed the existence of strangulated inguinal-scrotal hernia which he tried vainly to reduce and had the patient sent to the hospital.

By an incision parallel to Poupart's ligament the hernial sac was isolated and found to contain two intestinal loops in good condition of nutrition and only slightly congested. The existence of a hydrocele was discovered in the right testicle from which a citron-colored fluid escaped. Of the two loops found in the hernial sac, the right was formed from the cecal ampulla with the base of the appendix (about 1 cm.) and the terminal tract of the ileum (25 to 30 cm.) the left from a loop of the small intestine about 30 cm. long.

At operation the abdomen was found to contain a quantity of hemorrhagic, foul-smelling fluid. By traction of the cecum a portion of the ascending colon, normal in aspect and the appendix, which was dark in color evidently by sanguinary infarcts, were extracted. The author then proceeded to extract the segment of the intestine intermediate to the two herniated loops. This for about one-half meter in length was only slightly dilated and blackish blue in color studded with hemorrhagic infarcts and was evidently necrotic. The mesentery for a distance of 6 to 7 cm. from its intestinal insertion showed identical coloration with profuse thrombosis.

The author made a typical psoicectomy followed by resection of the necrotic intestinal segment with circular entero-anastomosis. After the reduction of the intestine into the abdomen the hernial sac was resected and the peritoneal breach closed by linear sutures. The hydrocele sac was partly resected. The patient had fully recovered by the seventeenth day after operation.

In discussing this case the author stated that the term retrograde strangulation was introduced by Maydl in 1895 to indicate the condition by which part of the strangulated organ is found internally in the abdomen while the remainder is found in the hernial sac. Maydl reported two such cases and since then several more have been reported and many theories have been suggested to account for the condition. Nevertheless it must be confessed that retrograde strangulation of the intestine re-

mains today one of the most obscure phenomena in the field of surgical pathology.

The author thinks that the findings in his own case favor the theories of Lauenstein and Lorenz. According to Lauenstein, traction on the two external loops may give origin in the mesentery of the anterior loop to a springing formation in the form of an arc with its concavity toward the ring. Peripherically the mesentery would remain free and fluctuant centrally toward its root it would find itself exposed to a greater or less tension. According to Lauenstein this tension is the impediment to free sanguinary circulation. Lorenz thinks that secondary metemesis of the internal loop makes it rigid so that the peripheral part is constricted and distended causing the production of a sharp angle at the level of the arcade described by Lauenstein.

W. A. BRECKEN.

Chaput. Treatment of Large Crural Hernias by Pediculated Adipose Graft (Traitement des grosses hernies crurales par la greffe adipeuse pediculaire). *Rev. d. chir.* 9 6, xlii, 43.

Chaput finds that most methods in use for the treatment of large crural hernias are inefficient. He now gets excellent results from the use of fat grafts.

The same incision is made as for inguinal hernia. The perit. crum and hernial sac are drawn into the inguinal wound. Supplementary thigh incision being made if required. Sutures are useless for the obliteration of the crural ring. He therefore closes it with pediculated strip of fat which is sutured to the edges of the ring. A rectangular strip is cut about two fingers wide and 10 cm. long, the base of which corresponds to the pubes and the inner border at the media line. The dissection is carried as far as the psoicous. The rectus muscle is incised, the peritoneum tripped from the wall, and the graft introduced. The graft is sutured to Gimbernat's and Cooper's ligaments, and to the crural ring. The summit is divided, the posterior part being fixed to Cooper's ligament behind the crural vein and the anterior part fixed to the crural ring in front of the vein. Chaput has operated upon five patients in this way with a success.

W. A. BRECKEN.

GASTRO-INTESTINAL TRACT

Boss. Occult Bleeding in Ulcus Ventriculi and Stomach Carcinoma (Beitrag zur Kenntnis der okkulten Blutungen bei ulcus ventriculi und Magenkarzinom). *Arch. f. Verdauungskr.* 9 6, xxi, Nos. and 3.

While there is a very great similarity between ulcus ventriculi and carcinoma of the stomach when viewed casually on closer examination it is seen that the occult bleeding which occurs in both differs not only in the manner of occurrence but also in the form. In the case of carcinoma the bleeding

is persistent while in ulcer there is a relatively quick disappearance of the blood also there is a difference in the intensity of the bleeding in both cases. From a consideration of these two differentiating characteristics Boas advances as an essential condition in the diagnosis that examination of the faces alone with regard to the occurrence of occult blood is not sufficient but that the examination of the stomach contents should also receive great consideration. By this procedure it will be possible to reduce the number of unnecessary operations now made in the case of unhealed ulcers which are not recognized as such, and to have such operation reduced to a reasonable limit. W. A. BEECHER.

Leonard V. N., and Dayton A. B. Multiple Acute Gastric Ulcers After Using Percy's Cold Iron for Inoperable Carcinoma. Preliminary Report of a Fatal Case. *J. Am. M. A.* 1916 LV 1 1549.

In this case rigid application of Percy's cold iron was ineffectual in eradicating the carcinoma and was followed by death after four days with lesions similar to those of extensive cutaneous burns.

The case is as follows: A woman, age 52 (two children) had had no bleeding since the menopause at 42 until November 1915. Then she had profuse vaginal bleeding for five days which recurred once. Further symptoms were loss of weight, slight pain, constipation, and painful defecation. Pelvic examination showed the cervix entirely destroyed by a rough firm growth extending far out into each broad ligament fixing the uterus normally in the pelvis.

At operation the technique most recently advocated by Percy was rigidly followed in every detail. On the second, third, and fourth days after the operation there was acute gastric dilatation. On the third day there was a urinary fistula and on the fourth day a paralytic ileus. During preparation for enterostomy the patient died suddenly.

At autopsy the peritoneal cavity contained 100 cc. of serosanguineous fluid with a little fibrinous exudate at the operative site. The intestines were distended. No obstruction could be demonstrated. The pleural cavities each contained 500 cc. of bloody fluid. There were a few subserous ecchymoses. Extensive pulmonary edema was present. The stomach was distended with gas. Its mucosa was perforated by about 24 clean round ulcers which measured from 1 to 10 mm. in diameter. Microscopically the loss of substance extended to the submucosa and was unassociated with any cellular change.

Grossly and microscopically intact squamous cell carcinoma was found peripheral to large areas of general necrosis. Many mitotic figures were seen. In one area seemingly dead carcinoma was found in the midst of normal looking connective tissue. Examination of the regional lymph glands revealed no carcinoma.

F. D. AND L. C. R. LL.

Paucher V. Surgery of the Posterior Wall of the Stomach. Method of Choice in Approaching the Rear Cavity of the Epiploon. (Chirurgie de l'epiploon del'arrière par la voie transperitoneale). *Bull. Acad. Chir.* 1916 LXXV 1 1549.

The author has been using this method since 1911. It is a simple and safe method for approaching the posterior wall of the stomach. It is indicated in all cases of gastric ulcer, gastric cancer, and in all cases of gastric perforation. It is also indicated in all cases of gastric tumor. The author has used this method in all cases of gastric ulcer, gastric cancer, and in all cases of gastric perforation. The author has used this method in all cases of gastric tumor.

The first step is to liberate the transverse colon and separate it from the epiploon. This allows examination of the posterior wall of the stomach. The duodenum and jejunum are then pulled down to the transverse colon. The peritoneum is then raised up the greater curvature and attached to the lesser curvature. The transverse colon is then cut and the duodenum and jejunum are then pulled down to the transverse colon.

The author believes this procedure allows the best exploration of the region of the lesser curvature and facilitates the discovery and removal of lesions which direct exploration does not.

W. A. BEECHER.

Ernst N. P. A Case of Congenital Atresia of the Duodenum Treated Successfully by Operation. *B. M. J.* 1916 LXXXV 1 1549.

The child a boy was robust at birth and there was no history of deformity in his family. He weighed 4,300 gram and showed no external sign of any malformation. From the first the child always vomited after suckling. On the third day he took the breast more actively than at first but two or three hours later he began to vomit with almost explosive violence. A little urine was passed and the movements were limited to a small amount of typical meconium without a particle of digested milk.

At operation an incision between 2 and 3 cm. long was made a little to the left of the middle line. After the anterior sheath of the rectus had been laid bare Mosetig basting was sewed to the edges of the skin with continuous silk suture so that the integuments were completely covered. On opening the peritoneum the dilated stomach protruded into the wound and was traced along the dilated pylorus into the duodenum which was uniformly about two finger breadths in width as far as it could be traced to the upper side of the transverse mesocolon. Below the colon here the intestine reappeared at the flexura duodenojejunalis. It was seen to have collapsed to the caliber of an ordinary pencil about 8 millimeters in diameter. The remaining part of the small intestine was examined quickly especially its lower portion but no stenosis was discovered.

A duodeno-entero-anterior anastomosis was made. A coil of small intestine about four inches below the flexura duodenojejunalis was drawn up in front of the transverse colon and united to the duodenum about the junction of the pars superior and pars descendens.

The intestines were held during the operation by Doyen's straight soft intestinal forceps. Continuous serous suture was applied then a continuous suture through all the layers the entire way around and, finally, a continuous serous suture was applied on the front. When a stomach-tube was passed through it a good deal of air and greenish fluid was discharged. The intestinal forceps were removed and immediately afterwards the jejunum began to fill. The walls of the abdominal incision were united with deep catgut sutures and interrupted silk sutures were applied to the sheath of the rectus abdominis.

A few hours after the operation, the infant was given a weak mixture of milk and water about 30 ccm. every two hours. He vomited a little several times in the course of the day and at 8 p.m. more violently so that the stomach tube was used and a little greenish fluid evacuated. At 7 p.m. an enema was given, but without any result.

The next day he was given one teaspoonful of castor oil twice and three enemas and had altogether four saline discharges, which, without any doubt contained digested milk. The child's appearance was good. No more violent vomiting occurred but there was slight sickness for some days. The bowels acted daily and the stools soon appeared quite normal. The temperature also fell to normal. Five days after the operation the child was sent home to be nursed by his mother. The dressings remained untouched until the fourteenth day when all sutures were removed; the wound had healed by first intention.

The infant's weight decreased during the first five days 90 grams more and was then 3,400 grams or 900 grams less than at his birth but afterward it increased considerably more than 90 grams week continuously for several months. Meals were soon allowed every third hour and when a few weeks had passed, the child could sleep all night without food. He is not remarkably quiet for his age, is vigorous and well developed. His weight one year later was 7,200 grams.

This is the second case of its kind in the literature.

ED. AND L. CORNWELL.

Carman, R. D. The Roentgenologic Diagnosis of Duodenal Ulcer. *Am. J. Roentgenol.* 9:611, 5.

The author's experience in the last year leads him to believe that deformity of the duodenal shadow is a valuable sign in the diagnosis of duodenal ulcer. However errors may arise from the following conditions: (1) Adhesions or spasm may cause an identical deformity. (2) Some ulcers do not produce a deformity. (3) It is sometimes difficult or impossible to sufficiently distend the duodenum to

definitely decide whether deformity is or is not present.

In regard to the first objection, the most common cause of deformity is undoubtedly ulcer.

To the second objection while some ulcers are so very small that they can hardly be palpated at peristalsis, still there is usually an accompanying spasm which causes deformity out of proportion to the lesion and it can be demonstrated by serial radiography. The film in difficult cases the author uses the horizontal position with the patient prone on the right side.

Carman has used serial radiography for a year with what he considers satisfactory results and an increase in correct diagnosis.

Deformities of the bull come under four headings: (1) the greatly distended type resembling a small pine tree; (2) the niche type where the distal part of the ulcer is visible; (3) the incus type single or bilateral; (4) the very small bulb of smooth contour representing a contracted duodenum.

In addition to duodenal deformity the author considers gastric hyperperistalsis, hypermotility with a bulky residue valuable diagnostic signs of duodenal ulcer. Although none of these conditions are pathognomonic of ulcer a proper correlation of the findings taken in connection with the history go a long way toward making the diagnosis. G. W. GAZER.

Martini, T. Chronic Ulcer of the Duodenum and its Gastric Repercussion. (*La ulcera cronica del duodeno sui ripercussioni gastrici*). *Pratt. med. Argent.* 9:6 N. 33, 38.

The indirect symptoms of duodenal ulcer are those showing a reflex alteration in the functions of the stomach.

Among the clinical symptoms that form the classical syndrome of duodenal ulcer the most significant are those derived from secretory and motor disturbances of the stomach.

Martini employs the analytical method, and studies the gastric secretion both before and after the ingestion of the test meal of Edsall and Whither. He then studies the gastric motility by the aid of radiology.

The exploration of the motility of the stomach in the author's cases revealed a marked peristaltic insufficiency with a median gastroparesis and an abnormal elongation toward the right, a hyperfunctional peristalsis, especially expulsive slow and difficult pyloric evacuation, bismuth being found in the stomach six hours after ingestion.

The author found it difficult to make a diagnosis of duodenal ulcer in the presence of the gastronomic correlative syndrome of Reichmann which he considers adaptable to two types of duodenal ulcer: (1) when the ulcer is found situated toward the pyloric sphincter and (2) when besides its location near the sphincter it is complicated at its level by cicatricial retraction and consecutive stenosis. A chronic duodenal ulcer complicated by stenosis

modifies entirely the clinical aspect of a simple ulcer of the same nature. The author considers the surgical treatment as insufficient in 30 per cent of the cases; the only satisfactory relief can be derived from an amputation.

The syndrome of gastric hypersecretion is a part of the type of Haver is the most common finding in the gastric ulcer. Pathology

Davis, B F Treatment of Devascularized Intestine *Proc M J Clin* 5

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On - trapped labor camps had
led to some cases of nervous an-
xiety. The owner may be en-
titled or interested in the matter as a citi-
zen; he cannot be deprived of his
personal freedoms and personal property.

Thompson, W M Post-operative Neut.

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necrosis, it must be remembered that even a very advanced inflammation of the appendix may be due to an infection of extra-appendicular origin.

To make sure that the appendix is the cause of a peritonitis the epigastrium should be incised and the stomach and duodenum examined. The mere fact that no exudate is noted from this region, is not sufficient because often an exudate finds itself a pathway by the inclined parts to the left and nothing is found in front or to the right.

W. A. BRECKMAN

Guthrie, D. The Prevention of Fecal Fistula in Suppurative Appendicitis. *A. S. J. Phila.* p. 6 July, 1931.

From his experience with 853 drainage cases in which the author has had three fecal fistulae Guthrie concludes that the following factors are of primary importance in their prevention.

The muscle-splitting incision should be used except in those cases in which the abscess is well defined near the median line. In these cases the author believes the straight incision should be used.

The treatment of the stump Whenever possible the author has inverted the stump using two rows of catgut and no non-absorbable material. Where this has not been possible he has resorted to the old cuff operation, turning down a cuff of the thickened peritoneal coat, ligating the stump with catgut and tying the fold of peritoneum over it.

3 The third factor is drainage. The author uses large soft rubber tubes, which he places as far away from the head of the cecum as possible and shortens them as soon as it is deemed safe. Leaks are never given until all drains are removed. He believes that gauze does not act as a drain and is conducive to fistula formation.

GARNWOOD

Secord, E. R., and Correa, L. H. The Results of a Year's Work in the Treatment of Acute Appendicitis. *Cleveland M. J.* 1931, VI, 41.

Of 46 cases of acute appendicitis operated upon by the authors, one died, one of seven cases with generalized peritonitis. Thus it would seem that the mortality rate from acute appendicitis should be very small and it is believed that the important essentials of a non-mortality treatment consist of early diagnosis and removal at the earliest time possible. The authors wish to correct an impression that appendix cases should not be operated upon after the third day unless or until localized abscess has evidently formed. An inflamed appendix should be removed immediately no matter what day of the disease, thus saving a certain large percentage of desperate cases.

A mistaken application of the dictum that elevated temperature is a constant symptom of appendicitis must be avoided. While an elevated temperature is probably always present some time during the course of the attack, it is by no means a constant symptom of a gangrenous or a localized peritonitis. A dead appendix no longer gives the

symptoms of appendicitis and the absence of fever has frequently been responsible for delay on the part of the medical attendant.

If a small portion of the appendiceal stump is opposed, the stump being a potential source of infection and the general peritoneum being better able to deal with it than the tiny sac of peritoneum with which the stump comes in contact after the application of purse string suture. Inversion of the stump without primary ligation is opposed also, because of the danger of hemorrhage. If the appendix contains pus but the peritoneum is free a rubber tissue wick is left down to the cecum in the presence of a localized abscess but drainage is used if generalized peritonitis is present a drain is always placed to the bottom of the pelvis. In all pus cases the immediate use of a stock preparation of mixed infection vaccine is urged. In the latter class of cases the Fowler position and the Murphy drip are also used and if post-operative ileus is feared, injections of eserine are advised.

L. K. ARMSTRONG.

Shaw, H. A. Appendicitis; Some Practical Suggestions Based upon Personal Experience. *Surgical Med.* p. 6 xv, 55.

In general Shaw does not agree with the dictum laid down by Ochsner regarding the time to operate in acute cases nor can he accept Blinn's version—

When a case is seen too late for early operation, and tumor is present and the pulse and general condition and cat dangerous desorption, if the tumor is increasing markedly and there are signs of infection spreading, no surgeon would hesitate as to operation interfere or is imperative because (1) temperature is a most deceptive guide (2) general conditions are often totally at variance with local conditions (3) the impossibility of outlining the tumor mass with rigid belly (4) and, to await the sign of infection spreading seems to be like locking the stable door after the horse is stolen.

Shaw believes that the time to operate upon acute cases of appendicitis is immediately after the diagnosis is made after the twenty-four hour period, opinions and statistics vary which difference, he thinks, is due to poor operative technique and judgment, poor ante- and post-operative treatment and deficient comprehension of the underlying pathological conditions. In over 600 cases, 50 per cent of which were estimated as acute, Shaw has had 6 deaths. He believes that in the surgical treatment of appendicitis there are no hard and fast rules. All preliminary cathartics are contra-indicated on account of the dangers of septic dissemination and the increased post-operative tympany and pain as well as the deferring of the operation for several precious hours awaiting their uncertain action. Where cathartics have been administered, the muscularis is still active for several hours after the operation, terrifically increasing the gas pains and being totally inefficient as a cathartic. He also holds this true of the so-called "high enema."

In the preliminary preparations for the operating

field he believes (1) in a thorough shaving of the whole abdomen (2) a very gentle scrubbing of the abdomen with green soap and a lysol solution rinsing with sterile water (3) application of alcohol packs. The immediate preparation, he believes should be to first mop the umbilical and inguinal regions with benzine sponges followed by fresh benzine sponges for the remainder of the abdomen after drying with a clean sponge a 50 per cent alcohol solution of tincture of iodine is applied followed with a sponge saturated with alcohol to remove the greater part of the iodine. (Since submitting this article for publication the author has adopted the use of McDonald's solution.)

In the making of incisions a thorough anatomical knowledge of the part is necessary especially of the innervation of the abdominal walls since an injury to the nerve supply is far more serious than simple incision of soft parts. In acute cases past the twenty four hour period, the usual incision of choice is the gridiron incision modified to meet the individual indication. Where there is a palpable mass, incision is to the center over the mass. It is well to make the incision moderate at first but susceptible to rapid enlargement the author believes the low "gridiron" incision and when necessary the addition of Harrington's extension to be ideal.

He also believes in the center of the gridiron incision being about one inch lower than McBurney gridiron incision for the following reasons (1) the most difficult part of the operation is the delivery of the appendix without rupture (2) the lesser danger to the twelfth thoracic nerve

The external oblique is cut transversely in emergency this, however being a court of last appeal for it necessitates the severance of the fascia at an angle to the direction of its fiber which, in the presence of infection, means an added danger of post operative hernia. In chronic cases, and those with in the twenty four hour period and those where the tumor mass is central, or when there is doubt whether the lesion is appendicular or pelvic he makes a mediolateral incision, which he considers the most practical incision in surgery because its advantages are multiple and its execution so simple. He has used this incision in more than 1000 pelvic and abdominal cases and has never found cause for regret. The following advantages are claimed: (1) rapidity and simplicity (2) minimum destruction to nerve supply (3) external strong belly wall left due to muscular interposition and lack of organic injury (4) beautiful exposure and ability to make a general exploration and to perform any ordinary work in the lower abdomen or pelvis (5) absence of hemorrhage and no tearing of muscles.

In cases requiring drainage recourse may be had to one of the three following procedures (1) through a simple stab wound away from the primary wound make a hole in the muscle for the drain in line with the skin and facial incision (2) omit tacking muscle to the median line at the lower end of the wound

Shaw never drains through a primary wound but always through a stab wound and where the drain is in proximity to the deep epigastric vessel he ligates the same well above and below the drain. The delivery of a retrocecal appendix he believes can be greatly simplified by mobilizing the lower part of the colon in the conventional manner and tacking it back immediately after the delivery. He does not advise the use of absorbent sutures to bury the stump in the drainage cases but uses instead fine chronic gut mounted on Dulox needles. He believes in removing the appendix when the same can be done without undue risk of breaking up adhesions and dissemination of infection into the general cavity and unduly prolonging the operation in the case of septic or debilitated patients. The appendicular visceral peritoneum in acute cases should be considered as septic and handled gently and if possible should be kept wrapped in gauze from the beginning to the end of the operation. Ligation of the meso-appendix is best accomplished by either the Watkins stitch or by the author's original stitch. Under no circumstances does he irrigate and the use of peroxide of hydrogen he considers little short of criminal. He believes in carbolicizing the stump but does not follow with alcohol and believes in making the purse string suture ample. In cases complicated with dense adhesions, where it appears best to sever the appendix first at the cecal attachment this is done with a knife close against the forceps attached to the distal portion and the stump is hurried at once. He believes it possible to attach towel clips to the peritoneum and in some cases to attach towel clips to the peritoneum the skin and gauze at the same time.

Suggestions as to the type of drainage follows: (1) In simple cases where there is doubt as to the necessity a small cigarette drain is inserted. (2) In purulent cases well walled off where the appendix has been removed a large cigarette drain is employed. (3) In purulent cases where it has been impossible to sever the appendix and there is a well walled off cavity a good sized tubular drain is used. (4) In cases not walled off a large sized tubular drain with one two or three cigarette drains at strategic points is used.

Drainage tubes should be soft should not impinge with force on the debilitated walls of gut and should not come in direct contact with any suture lines involving the gut and should be placed in dependent parts. In cases where the drainage is through a stab wound several strands of silk worm gut are inserted in the lower angle of the original wound where the anesthetic has been unduly prolonged or where the operation has necessarily followed several hours after the ingestion of food gastric lavage is recommended.

In the after-care of drainage cases Shaw uses the Fowler position and the Murphy drip method using sugar instead of salt solution. In the post-operative care of the wound after four or five days when the discharge is extremely thick and heavy it is some-

times washed out with six or eight ounces of salt solution, to mechanically remove the chief amount of debris. After the first forty-eight hours Shaw invariably washes out and fills all cavities and saturates all drains with alcohol (U S P) at least once and sometimes twice, daily for the following reasons: (1) Alcohol is a harmless antiseptic. (2) It is a mild astringent. (3) By its hygroscopic action it promotes a local outpour of serum with its contained anti-bodies. (4) Even when diluted with transudates or exudates it makes a poor culture medium. (5) When it first comes in contact with the great mass of superficial debris, it encapsulates large numbers of micro-organisms. (6) It does not render soluble and wash away the primary plastic lymph, either in the healing abdominal wall or the peritoneal surfaces.

Shaw uses, as a routine, four to eight ounces of saturated solution of magnesium sulphate, at 95° slowly introduced into the rectum with a No. 9 catheter twenty-four hours after the operation, except in cases of extreme debility and anemia.

EMIL C. ROUSSEAU

LIVER, PANCREAS, AND SPLEEN

PERUSSIA, P. Partial Hepatoptosis Due to Interposition (La epatoptosi parziale da interposizione). *Riforma med.*, 9, 6, 1934, 337

Radiologists understand by hepatoptosis the condition shown in the radiologic picture characterized by the transitory and partial interposition of intestinal loops between the convex surfaces of the liver and the diaphragm. It is transitory because it may disappear momentarily owing to changed conditions of meteorism of the intestinal loops, by changes of endo-abdominal pressure, or by changes in the position of the patient. The interposition is partial because the liver does not lose complete contact with the diaphragm, the posterior border maintaining intimate contact with the posterior walls of the abdomen and the diaphragm while the external and anterior parts recede.

In his experience and study of this radiologic picture the author has noticed a certain coincidence of morbid facts which cannot be considered casual and he gives an etiopathogenetic conception of hepatoptosis which is different from that usually accepted. This coincidence consists of organic alteration of the gastro-intestinal tube. Of 5 patients studied 3 showed a pyloric stenosis with grave secondary gastrectasia, in the other 2 there was benign pyloric stenosis with hour glass stomach due to mediogastric stenosis caused by ulceration of the small curvature. In all the 5 cases the interposition of intestinal loops between the liver and diaphragm coincided with a meteoric condition of the colon and the degree of hepatoptosis was proportionate to the intestinal distention.

The authors review the literature of hepatoptosis and show that in the greater part of the observations reported in which the condition of the gastro-

intestinal tract was described the coincidence referred to above was found.

The existence of this coincidence explains the mechanism of the phenomena and leads to a conception of hepatoptosis different from the usually accepted one which ascribes it to anomalies of the methods of fixation. The new conception makes the predominant factor of the phenomenon the alteration of the gastro-enteric tube.

Partial hepatoptosis by interposition is distinct from the wandering liver of Cantani and from Glenard's hepatoptosis, the first showing a complete fall of the viscera and the second showing a false ptosis and a deformed unusually mobile liver.

W. A. BEEHMAN

CASE, J. T. Some Statistics on the Negative and Positive Roentgen Diagnosis of Gall Stones. *Am J Roentgenol.* 9:10 34, 246

The author's statistics may be divided into five groups as follows:

1. Positive roentgen report of gall-stones with stones found at operation: 20 cases out of a total of 4, making percentage of successful positive diagnosis of 49 per cent.

Positive report and no stones found at operation: 4 cases.

3. Negative report and no stones found at operation: 24 cases out of 57 making a percentage of successful negative diagnosis of 95 per cent.

4. Negative report and stones found at operation: 13 cases, failure to diagnose in 5 per cent.

5. Report of probable gall-stones out of 22 cases: 8 were found to have stones, and in 14 no stones were found, a percentage of correct diagnosis of 36 per cent.

Of the 3 cases in Group 4, 9 had disease of the gall bladder other than stone and of the 4 cases of Group 5 where no stones were found 11 had diseased gall-bladders.

Out of a total of 55 cases with diseased gall-bladder X-ray evidence pointed definitely to this condition in 48 cases, or in 88 per cent, while gall-stones were accurately shown in 50 per cent of the cases where they were present.

G. W. GRACE

DEPAGE, A. Note on Twelve Cases of Splenectomy for War and (Not sur cas de splénectomie pour blessures de guerre). *Bull et mém. Soc. de chir. de Paris* 9:6 311, 39.

The earlier reports from the war zone concerning splenectomy for war injuries showed that the operation was almost invariably fatal. The cause was attributed to perturbation in the economy by suppression of a gland all the functions of which are not yet known.

DePage has up to now practiced 12 splenectomies with 8 deaths. Of the 12 there were 4 in which the spleen alone was injured and of these there were 3 recoveries. In the other 8 cases the injury to the spleen was accompanied by injuries of other organs.

tures mostly due to shells. The treatment consists in clearing of the wound drainage use of Dakin's solution, immobilization daily dressings. Drainage was as free as possible and whenever there was any increase in temperature or pain, fresh drainage incisions were made.

Of the 4 cases 3 died had amputations in 6 there was complete consolidation recovered with pseudo-arthritis 3 are in process of recovery. One of the deaths was due to septicemia, and the other to a severe bladder injury the fracture progressing favorably. W. A. BRYAN.

Sever, J. W. Fracture of Tuberosities of the Tibia. *Am J Orth Surg* 9 6, xiv N 5

The author reports three cases that are under his observation which were all traumatic in origin. In such cases there is produced a condition of knock-knee and joint-strain which causes a change in the weight-bearing surface of the knee joint. He thinks balancing of the foot and leg in proper weight-bearing lines will relieve the knock-knee and joint strain. He quotes Jones' report of two cases. Fowler a one case and Lange two cases.

PETER LEWIS

Robinson, E. F. Fracture Dislocation of the Astragalus. *J Surg Pathol* 9 6, xviii, 606

The author's experience has been unsatisfactory with the older methods of treatment of fracture dislocations of the astragalus and he has found that the recipient was more or less of a cripple the remainder of his life.

In the case reported he shows an excellent result attained by open operation after the usual manipulation under anesthetic proved of no avail. An incision four inches over the outer side of the ankle was made, the fragment picked up, the wound closed without drainage and the plaster cast applied. An excellent result was obtained.

H. W. MERRICK

Cotton, F. J., and Henderson, F. F. Results of Fractures of the Os Calcis. *Am J Orth Surg* 9 6, xiv, 300

The authors report the results obtained in 75 cases. The great majority were smashes of the os calcis received in falls on one or both heels from a height of from 5 to 40 feet. In general there was a "smash" below the weight-bearing vertical line of the tibia, running more or less, mostly less, vertically and various radiating lines running down and forward and backward. The heel was driven up and often was driven outward. The whole bone was compressed vertically and expanded laterally. There was often a pushing of fragments inward under the ankle, and almost uniformly a considerable pushing outward of bone-fragments, capped by the usually intact outer lamella of the os calcis under the external malleolus.

The authors believe that os-calcis fracture of the usual compression type is one of the most serious

lesions met with so far as future function is concerned. The prognosis as to use is as serious as fracture of the femur at the hip.

Late operations for correction are useful, but far from ideal in results. Palliative measures (plates, pads, braces, and shoe modifications) are usually useless. The authors recommend the Cotton reduction outlined in 908. PETER LEWIS.

Loonabery, B. F. Fracture of Os Calcis. *Surg Gynec & Obst* 9 6, xiii, 638

Fracture of the os calcis has been considered a rare condition. Recent statistics show that it forms about per cent of all fractures. In the past the condition has been largely unrecognized and treatment neglected. Diagnosis without X-ray examination is difficult. The cardinal points in diagnosis are:

History of injury (usually a fall from height landing on the feet)

Physical findings:

- (a) Heel broadened and everted
- (b) Absence of convexity on both sides of the Achilles tendon
- (c) Sinking of malleoli especially the internal one
- (d) Flattening of the longitudinal arch of the foot

(e) Ex. hyemesis

(f) Sometimes, repeat two

5. Pain

A. In old cases

- (1) Across front of instep
- (2) Under point of heel
- (3) Under external malleolus
- (4) In sole of foot

B. In recent cases

- (1) Diffused pain through heel and ankle aggravated by attempt to stand on foot by manipulation

4. Radiogram

No case of ankle injury should be finally diagnosed without this means.

Usually more than one line of fracture exists. Most frequently fracture begins in the concave articular facet of the os calcis where it articulates with the wedge-like articular facet of the astragalus. The portion of bone posterior to this point is usually driven upward and backward either in a single mass or broken by one or more lines. Usually there is considerable impaction. This displacement backward and upward produces flattening of the longitudinal arch of the foot. The fracture may be comminuted and occasionally may be compound. There may be a tear fracture at the insertion of the Achilles tendon or of the plantar tendon, or on the lateral aspect at the attachment of the calcaneofibular or lateral talocalcaneal ligament. There may be a simple line of fracture without displacement.

The results of treatment of this condition in the past have been poor. The condition is usually un-

recognized and neglected. In old cases palliative treatment is adopted such as arch supports for fallen instep pads under the heel for pain in the sole of the foot or operative procedures to remove spicules and projecting callus. In recent cases the normal contour of the bone should be restored. For tear fractures the fragments are sutured in position. Cases with backward and upward displacement of the posterior fragment (and these form a large majority of fractures of the os calcis) are reduced by passing a urethral sound in front of the Achilles tendon making strong downward traction while counter upward pressure is made on the anterior end of the bone in the sole of the foot. The fragments are held in position by severing the Achilles tendon and incising all in a plaster cast to the knee. While the cast is hardening the ball and heel of the foot are pulled toward each other making a high elevation in the arch of the foot. The cast is kept on for four weeks then removed and passive motion and massage used daily with hot foot soaks. The patient should be kept off his feet for ten weeks then arch supports are fitted in the shoes and he is gradually permitted to put weight on the foot while walking with crutches.

The disability usually lasts six months or more in recent cases properly treated. In unrecognized and neglected cases the disability lasts from six months to two years and may even become permanent.

Groves E. W. H. and Brown T. H. The Treatment of Gunshot Fractures. *Lancet* Lond. 916 cxc, 990

In a typical gunshot fracture the authors call attention to three main characteristics (1) great comminution with displacement (2) severe sepsis and (3) pain which becomes intolerable with movement.

The indications are directed to saving life and limb and to restoring function. To accomplish these results four things are necessary (1) immobilization for a long period (2) free drainage and frequent redressings (3) extension in a correct line (4) maintenance of both wound treatment and extension for a period which may be prolonged for several months. In addition the nearby joint should be immobilized so that the limb is in physiological rest and the flexors are relaxed. Massage and movement of the limb from an early period should be practiced.

Grossly infected wounds are frequent after fracture by bombs and shell fragments also by military rifle bullets at proximal ranges. They should be opened up freely at the earliest moment. Treatment should not be delayed for X-ray evidence if it is not at hand. Missiles and particles of clothing as well as all extraneous matter should be removed. Small punctured and penetrating wounds should be left alone with a simple dressing until further treatment can be given in a general hospital provided there is no evidence of infection.

In comminuted fractures the authors state with

positiveness that however freely they are opened up the bone fragments must be left *in situ*. There are only two exceptions to this rule (1) if the moving bone fragments (2) when the articular end of a bone is shattered all loose bone should be removed from the joint and (3) if a bit of bone is clearly devoid of all articular connection and lies in a septic wound it should be taken out.

Operative fixation of fragments is not recommended. If much minutely situated plating or wiring is useless and a mechanical impossibility and when the fracture is not comminuted it should be treated by extension. Barington's intraplate involution leads to non-union when the unit is already infected.

A very good description is given of the latest and best apparatus made of an hydraulic transmission reported in the *Medical and Surgical Description of the technique in the practice of immobilization*. L. T. A. L. C. 201

Darrach W. A Plea for the Immediate Reduction of Fractures. *Lancet* Lond. 916 cxv, 990

The author believes that the ill health which follows a fracture is due to the permanent disability and deformity and that a fracture with displacement should be considered as much an emergency as a late appendicitis or perforating ulcer. One should preferably have an X-ray first to assist in making an exact diagnosis but if not available manipulation is indicated without a early reduction is desirable and of sufficient advantage to offset the value of X-ray.

Open operation should be deferred until natural healing has an opportunity to marshall her forces and resistance and get the injured area entrenched behind a zone of infiltration.

Immediate reduction of fractures with displacement results in easier and more accurate apposition less pain less swelling less reparative tissue formation and a more rapid solid bony union.

H. W. MEYERDIN

Gallie W. E. Open Operation for Fractures. *Can. J. Med. Sci.* 96 cxxx, 63

Gallie in his article makes a plea for the use of boiled bone for plating fractures. His experiments show conclusively that when any form of transplant is used death of the transplant follows with subsequent replacement of the dead bone by new formed bone which is deposited along the ingrowing capillaries. Since this is true the author believes that boiled bone plate can be used more successfully than autogenous grafts as they can be prepared beforehand.

Gallie uses a plate made from beef bone curved in transverse section and thicker in the middle than elsewhere. For fastening the plate screws of bone are used these are cut on a lathe. In cutting the hole for the screw a tap smaller than the screw is used, into the thread thus cut a polished steel screw is driven this cuts a thread and hardens it by com-

pressure so that when the bone screw is put in it does not crumble.

When the bone screw is turned a short stem is left attached to the head, this is tapered and squared to fit into a chuck made like a clock key by which the screw is driven home. The stem is turned down thin at its junction with the head so that it can be broken off after the screw is in place.

Gallo also describes a bone holding clamp for retaining the fragments in place this can be better appreciated by reading the original article.

FRANK D. DICKSON

SURGERY OF THE BONES, JOINTS, ETC.

Walther C. Repair of a Branch of the Trapezius and Splenius with a Clavicle Adhering to the Cervical Vertebrae (Réparation d'une branche du trapèze et du splénius avec clavicle adhérent à la colonne cervicale). *Bull. et mém. Soc. de chir. de Par.* 9 6 xiii, 585.

The patient reported by Walther was injured by a gunshot and showed a deep clavicle about the size of a five franc piece adhering to the cervical vertebrae at the crest of the left half of the sixth and seventh cervical vertebrae. The trapezius, splenius, and first layers of the rhomboid had been sectioned by the projectile.

It was impossible to elevate the shoulder and pain radiated along the spine. Walther excised the clavicle, freshened the muscles and sutured them which not only resulted in the correction of the deformity but left a condition which as far as construction was concerned, did not differ from the opposite side.

W. A. BAKERMAN

Linberger Hypodermic Treatment of Joint Injuries (Ueber die angedehnte Behandlung bei Gelenkverletzungen). *Münch. med. Wochenschr.* 9 6 liii, 33.

Linberger reports the details of 8 cases of severe injuries of the knee-joint treated by Bier's method of continuous hyperemia which was found practicable in field surgery and requires no more time than other procedures for severe wounds. Of the 8 cases 7 were cured.

This method is particularly useful in knee joint gunshot injuries which are almost always infected wounds. It obviates and checks the results of infection and thus renders major operations unnecessary. Fever abates soon after the beginning of treatment and pain is usually decreased within twenty-four to thirty-six hours. The end functional results were good.

W. A. BAKERMAN

Mouchet, A. Treatment of Fistulous Ostitis by the Polyvalent Serum of Lecithine and Vallée (Le traitement des ostéites fistuleuses par le sérum polyvalent de Lécithine et Vallée). *Bull. et mém. Soc. de chir. de Par.* 9 6 li, 598.

The author reports the moderately satisfactory results which he has observed in the treatment of fistulous ostitis by the serum of Lecithine and Vallée. The use of this method offers doubtful advantages and may occasion great danger.

The author believes that the majority of ostitis should be treated surgically. The mechanical action of the serum which would aid in the elimination of the sequestrum is manifested only when no surgical treatment has been instituted.

The calcification obtained after the use of serumized dressings is not always durable. Serotherapy does not always suffice to bring about recovery and then surgical interference has to be adopted under the least favorable conditions. Moreover the employment of the serum may give rise to accidents, lymphangitis, erysipelas, and abundant and fetid suppurations from the tract of the ostitis.

Serum may be of use in the treatment of the soft parts and in cases of superficial ostitis but it should be used with extreme caution. W. A. BAKERMAN.

Armstrong, H. M. and G. L. Jr. Treatment of Injuries in the Vicinity of the Elbow-Joint. *Ann. Surg. Phila.* 9 6 liii, 596.

The authors review the anatomy of the elbow joint and call attention to the gravity and frequency of injuries in this region. They divide elbow joint injuries into

Fractures of the lower end of the humerus (1) supracondylar fracture (more or less transverse of the shaft above the condyles) (2) T or Y shaped fractures (3) epiphyseal separation (4) fractures of the external or internal condyles and epicondyles

5 Lesions of the radius and ulna (1) dislocation backward of the radius and ulna (2) fracture of the upper third of the ulna, with or without dislocation forward of the radius (3) dislocation forward of the upper end of the radius (4) fracture of the olecranon process of the ulna (5) fracture of the neck or head of the radius (6) subluxation of the head of the radius (7) fracture of the coronoid process of the ulna.

3 Simple sprains of the elbow

Treatment and surgery of these conditions are discussed. Attention is called to the fact that frequently dressings are responsible for stiffness following joint injuries, and that the best results are obtained by dressings in acute flexion as soon as the acute symptoms have subsided, during which time they are dressed in extension. Passive motion is advised when due to prolonged immobilization, adhesions, etc., though many able authorities advise to the contrary.

Ankylosis due to excessive callus or displaced fragments demand operation and massage. The use of splints, etc., is advised against.

H. W. MEXTERO.

Hardouin, P. Resections of the Elbow in War Surgery: Functional End Results (Observations de résections d'os en chirurgie de guerre: résultats fonctionnels). *Bull. et mém. Soc. de chir. de Par.* 19 6 xiii, 163.

The 51 elbow resections reported by Hardouin are divided into 3 groups (1) primitive resections

(within 24 hours) 19 (2) secondary resections with drainage 25 (3) late secondary orthopedic resections, 7

The first group gave the worst results. In 9 cases there was no voluntary improvement. 5 are ankylosed, 2 semi-ankylosed, 3 with limited flexion.

The second group gave 3 good results with extended strong movement, 4 with limited flexion, 7 ankyloses (5 with half extension or somewhat more, 2 with bad extension), 6 with no spontaneous movement, 5 with defective flexion. Of the 25 cases 7 arms are good or fairly good, 5 are ankylosed and in 13 the arm can give no real service.

In the third group among the 7 cases 4 showed good results, 1 moderate, and 2 bad.

Despite the poor functional results the author thinks that resection of the elbow with drainage is an operation of necessity when the life of the patient or the limb is endangered.

W. A. BRENNAN

Legg, A. T. and Ober, F. R. Tendon Transplantation. *Internat. M. J.* 1916 xliii 333

The authors' present conclusions are drawn from 100 cases of tendon transplantation at the Children's Hospital, Boston, during the five years previous to 1914. Transplantations at the ankle alone were considered.

Under general considerations the authors call attention to the proper muscle balance being sustained following transplantation, the inadvisability of waiting too long, probably two years after the disease would be best because of the weakness following fixation, etc., with braces. Actual paralysis must be determined as muscles may appear to be paralyzed but are only apparently so from overstretching, etc. Leverage and mechanical possibility must be considered.

Operative considerations favor correction of deformity, first, the tendon-transplantation making the wound away from the course of the tendon and inserting it well into the bone after passing under fascia, fat and annular ligaments. Insertion with out tension and careful closure of the tissue overlying the tendon are advised to prevent adhesions.

Post-operative treatment consists of plaster of Paris in an overcorrected position, light massage at the end of three weeks, wearing of a plaster cast for three months and a brace two to four months.

Causes of failure are faulty technique, poor selection of cases, and inefficient after-care. Too long wearing of braces is warned against. Six months' time is sufficient.

H. W. MEYERDINO

Jones, R.: Notes on Military Orthopedics. Suture of Nerves, and Alternative Methods of Treatment by Transplantation of Tendon. *Brit. M. J.* 1916 l, 63 679.

The author calls attention to the proper treatment of nerve injuries causing limb disability. His wide experience before and during the war makes his observations most valuable. In his opening paragraph he dwells upon the orthopedic features in the

treatment of nerve injuries, as nerve injuries rarely occur without damage to the surrounding structures—bone, tendon, muscle and skin.

In suture of the nerves the following points should be observed:

1 The correction of contracture of the skin or muscle and all the anatomical constituents from the skin to the bone on the concave aspect—that is to say on the abnormal direction the contracture takes.

2 When possible the freeing of joints from all adhesions and the restoration of the mobility of the joint in all cases where ankylosis of the joint is threatened.

3 The maintenance of the paralyzed muscles in a position of relaxation throughout the period of recovery.

4 The practice of massage during recovery but without once allowing the relaxed muscle to be stretched.

He lays especial stress upon the relaxation of the muscle and has found that this elemental principle is often neglected. He says the most skillful operation performed on the most suitable case will prove a fiasco unless the affected muscles are kept continuously relaxed until recovery takes place.

He recalls his previous statement that though poliomyelitis may permanently destroy the motor cells of the anterior horns of the gray matter and thus forever render the muscles dependent upon them useless, this however has seldom been the case and clinical experience has shown complete paralysis with complete recovery and many partial recoveries, thus proving that the motor-cells thus concerned suffered only temporary injury.

The difference between an overstretched and a paralyzed muscle must be recognized and this can only be done by putting it in a position of relaxation and giving it prolonged rest for at least six months. Although many of the principles are applicable to gunshot wounds there is a limit to conservative methods, and in cases presenting a promise of success nerve-suture is advised. The author states that his experience in tendon transplantation in poliomyelitis has been of great value to him in caring for gunshot wounds.

H. W. MEYERDINO

Quénou E. Partial Amputations of the Foot for Gunshot Wounds of War (Note sur les amputations partielles du pied dans les plaies par projectiles de guerre). *B. H. et Mém. Soc. de chir. d'Paris* 9 6 xli 538.

Injuries to the foot by gunshot wounds are comparatively rare. In the statistics of Nové-Josserand, Gourdon and others in 2,516 amputations there were only 110 partial amputations of the foot, and a great many of these were on account of frost bite.

Quénou thinks that in injuries to the foot as in those of the hand, even when the injury is severe there should be no haste to amputate and when amputation is necessary it should be done in healthy

tissue. If there is no appearance of infection, the general rules of surgery should be followed i.e. removal of the projectile and cleansing the wound. If the operation is done early with arrest of the projectile in the tissues, reunion by first intention may be obtained even in articular wounds with a rapid cicatrization and return of the functions of the foot. If there is infection and the joints are suppurative, the phlegmonous foci must be incised and evacuated. If drainage of the articulation is difficult amputation may have to be done but this should be confined to plane section in the infected articulation.

The final plastic restoration should be delayed for several weeks when the field of operation is in a generally healthy condition. This will give opportunity for an economic operation. As much of the calcaneum as possible should be preserved.

Protopopoff operation, either modified or not appears to be the most desirable. W. A. BEAVER

ORTHOPEDICS IN GENERAL

Painter, C. F. Hallux valgus. *Boston M J* 9 6 April 636.

The etiology and treatment of hallux valgus is here taken up. Hallux valgus is merely an outward deviation of the great toe accompanied usually by bursa-formation, and more or less painful and disabling static disturbances.

Hallux valgus is nearly always accompanied by a relaxed anterior arch with its flat forefoot callus formation, and general discomfort. It is essentially a shoe deformity, short and pointed shoes giving the greatest number of cases.

Pathologically hallux valgus is not an arthritis at all shows no thickening of the metatarsal

phalanx, but does exhibit an atrophy or erosion of the articulating head of the metatarsal.

For operative treatment Painter recommends the old Ilizarov operation removing the metatarsal head, and advises the use of a metal splint to prevent riding up of the phalanx on the metatarsal. He condemns the use of a ring in the bursa between the metatarsal and phalanx. R. G. PACKARD

Cross, C. Golfer Foot. *Med P* 9 6 April, 636

Golfer foot is new name for the old condition of metatarsalgia and as defined by Cross, is a distortion downwards of the heads of the second, third, and fourth metatarsals or any one of them. In the golfer this condition is due to the fact that when making for instance a right handed drive, the player throws most of the body weight over the anterior portion of the left foot so the foot has been elevated with the upswing. This weight is distributed mostly to the outer half of the arch, including the third, fourth and fifth metatarsal heads, and strain may be produced. This condition of relaxation or rupture of the ligaments of the anterior metatarsal arch, may also occur in any overused foot.

The symptoms include first slight discomfort at the base of the third or fourth toe, slight swelling on the dorsal surface, pain on pressure and a feeling of irritability or stinging. Physical signs are practically equal. Treatment consists in correcting the arch by the application of dry heat, holding up the arch by some flexible support, exercising the feet nightly and reducing the acute inflammation by a wet dressing of magnesium sulphate. The patient should trim his toes in more should not change suddenly from high to low heels, and should wear shoes not too short. R. C. PACKARD

SURGERY OF THE SPINAL COLUMN AND CORD

Castex, M. R. Vertebral Metastatic Carcinoma Primary in the Breast (Carcinoma cribral metastático por primitivo de la mama). *Pra* 54 *Med Argent* 9 6 April, 636

The author reports a case in a woman of 4. The history showed that in October 1915, the left breast had been excised on account of tumor. Examination in February 1916, showed the vertebral column grossly deformed, dorsolumbar kyphosis, movements of extension flexion and lateroflexion, considerably reduced and painful, pressure very painful from the second dorsal to the sacrum, apophyseal deviation in all the zone of the kyphosis, intense lumbago on both sides of the column in the dorsolumbar zone, bland elastic, and very painful.

Three possible genetic causes for the spondylitis, leuc, tuberculous, or neoplasm, are considered. The first two Castex rules out for reasons given and

deduced from the symptomatology. He thinks the mode of onset the morbid course, and the actual symptoms fully correspond to a vertebral carcinoma process. The fact that the patient had already had neoplasm of the left breast is significant and although it may be objected that the spondylitis might have existed prior to the neoplasm yet the author thinks that this in the history clearly prove that this was the case.

Vertebral carcinoma is never primary it is always secondary metastatic. The observations on record of primary carcinoma do not stand before anatomopathologic criticism and they are all shown to be endothelioma or primary sarcoma. Vertebral metastatic cancer always corresponds to the primary type from the histological viewpoint. It is much more frequent in women than in men, and corresponds with cases of mammary carcinoma. The author is aware of only one case of vertebral

carcinoma in which the uterus was the prime focus. In similar cases in man the prime focus is in the prostate or bronchii.

The point of incidence in the vertebral body is usually the spongy tissue and it develops most commonly into osteoclastic carcinoma but it may take the osteoplastic form. The dorsal and lumbar regions are the most frequently attacked and the process usually extends to many vertebrae.

The author points out that a woman operated upon for a mammary cancer many months or years later show nervous phenomena which are a consequence of the primary neoplasm. He refers to such cases and he thinks that the pathology of vertebral carcinoma can explain all the spondylitic phenomena.

The prognosis in this as in other advanced cases is fatal. No reliance can be placed on arsenical radio-activity or colloidal preparations which have always failed in such a condition. W. A. BREWSTER.

Schachner, A.: Injuries of the Spinal Cord with Report of Gunshot Injury of the Cord at the Fourth Cervical Vertebra and Successful Removal of Projectile. *S. G. G. Obst.* 66, 221-266.

The case reported was that of a boy shot with a 2-calibre long projectile fired from a rifle. It lodged in the posterior columns of the cord and was successfully removed from the cord at the level of the fourth cervical vertebra. In this paper dealing with injuries of the spinal cord the author emphasizes the following points:

While a carefully prepared set of radiographs stereoscopically studied will supply valuable data as to the course of the projectile and the probable nature of the spinal injury from which valuable con-

clusions as to the possible existence and probable extent of cord injury can be drawn it is pardonable to emphasize the warning that the diagnosis however carefully made is frequently misleading.

The term concussion with regard to the cord which there is considerable difference of opinion in being accepted by some and rejected by others. The term may be said to mean the impairment of the functions with which the spinal tract and anterior horns are concerned.

If a hematoma has occurred a laminectomy will remove the pressure within the spinal canal.

Hematomyelia is a pathological condition of the spinal cord which is not rigid and a drainage. The term and other terms are estimated as to their frequency. Hematomyelia is a condition of the spinal cord in which the white matter is completely supported in the gray matter. As the gray matter is most predominant in the cervical region it is the most favorable region for its occurrence.

The Röntgen-ray spinal puncture and a careful neurologic study is the diagnostic triad upon which we are dependent.

It is difficult to avoid the conclusion that an accurate estimate of the cord destruction is frequently impossible and if this fairly represents the status it is not proper to lay down the axioms. When in doubt explore.

If modern surgery in lay claim to no a hie ment it the elimination of doubt through cautious exploration and the fact that some exploration can be shown to be useless or even a few fatal does not in the author's judgment invalidate the broad application of the rule.

SURGERY OF THE NERVOUS SYSTEM

Sicaud, J. A. and Dambrin, C.: Nerve-Sutures (Sutures nerveuses). *Bull. et mém. Soc. d'hist. nat. P.* 1916, xxxii, 96.

In reviewing the observed cases of nerve suture for the past 15 months it appears that the classic techniques followed have not fulfilled the expectations held out and that other operative methods must be sought to give better results.

Experimental operative interventions made prior to the war — clear sections with a minimum of suppuration — are very different from those met with resulting from projectiles. The lesion is more extended fusion is distant in the nerve trunk the cicatrix is hard and retractable formed at the expense of tissue a long time suppurative and it may even be fibrous or cartilaginous in consistency. The operator may attempt a partial resection and endeavor to make an end-to-end suture of such altered tissues which is sure to be a therapeutic

failure or if a large resection is attempted end-to-end suture is not utilizable. In such case suture *par doublement* may be tried but this is doomed to total failure. Unfortunately the cases are rare in which the extent of the nerve injury is so reduced that it is seen within the operative field and that the ends may be united directly to other nerve fascicles with preservation of the surrounding nourishing tissue. This when it happens is the method of choice and offers the best chances of recovery.

After having performed a large number of nerve sutures by different classic methods the authors are led to believe that end-to-end suture after strict resection of all fibrous parts remains the best method but that whenever such suture is impossible the method of choice is the nerve-graft which may be either by heterograft or autograft.

The authors describe their technique of nerve

grafting. They have performed 11 such operations since December 1915 but it is too early for an opinion as to the results.

Gosset, who submitted this report, stated that according to figures published in 1915 by Sicaud, the actual number of cases in which the authors had performed nerve-suture was 37. There appears to have been only 1 success in the series so there was nearly 100 per cent of failures. Personally he has made 353 interventions for lesions of peripheral nerves during the war 126 nerve-sutures, and 25

nerve-grafts. Referring only to cases before January 1915, of 2 cases of complete interruptions, 6 were treated by excision and end-to-end suture. In all there was functional amelioration and in 5 there was a return of mobility. Of the other 6 cases 2 were treated by *dédoublément*. In one of these there is partial restoration of motion and sensation. The other 4 cases were treated by liberation. In each case the result was nil. The end-results of some of his graft cases are encouraging and he will report on them. W. A. BRECKMAN.

MISCELLANEOUS

CLINICAL ENTITIES—TUMORS, ULCERS, ABSCESSSES, ETC.

Roffo, A., and Qallo, N. Contribution to the Chemical Study of Tumors (Contribución al estudio del quimismo de los tumores). *Prespa. med. Argent.* 9 6 No. 12, 378.

The experiments were carried out on rats.

In a tumor weighing 36.256 gm. the total solid substances were 14.05 per cent, while the total of water found was 85.95 per cent. The amount of protein found was 56.5 per cent of the dry substance, organic matter and minerals 3.6 per cent neutral 1 is 10 per cent phosphates 8.7 per cent the minute rest was found composed of phosphorus and nitrogen.

From the results of careful experimentation, the authors draw the following conclusions:

1. The chemical composition of a tumor is constant.

2. The globular composition is constant and the same in carcinoma as in sarcoma, artificially produced in the rat. RAOU L. VIGORAN.

Villa, G. T. Malignant Pustule Treated by Bac. celli's Method (Un caso de pustula maligna tratado por el método de Bacelli). *Rep. de med. y cir. Bogotá*, 916, VII, 304.

A small puriginous void in the left malar region of a child of 10 existed after local treatment, including cauterization. The scar became surrounded by small pustules, there was considerable edema, and the neck ganglia tumefied and painful.

The child was removed to the hospital and an intravenous injection of 5 cubic centimeters of bichloride of mercury solution in artificial serum 1:1000 was made. Four milligrams of mercury were used. The treatment consisted in the use of compressions on the face and chlorate of potash gargle. Within a few days all symptoms were subsiding. When last seen there was only a scar the edema had disappeared, and the ganglia were no longer apparent. W. A. BRECKMAN.

Simmonds. Cachexia of Hypophyseary Origin (Ueber Kachexie hypophysären Ursprungs). *Monatsh. med. Wchnsch.* 9 6 XLIII 243.

About two years ago Simmonds published the account of a case of puzzling cachexia which terminated in death, and in which the cause was deemed to be an embolic process of the hypophysis.

The case which he now reports is that of a man of 53 who for more than a year showed anemic and other symptoms. An occult cancer was suspected. Autopsy showed that apart from terminal pneumonia there was a hypophyseary tumor somewhat larger than a hazelnut which had almost completely destroyed both hypophyseary lobes. In the absence of other explanation the cachexia can be explained only by the hypophyseary alterations. There was no sign of a renegade pituitary body, only the basophilic adenoma of the hypophysis polyuria and adiposis were lacking but on the other hand genital atrophy and cessation of spermatid secretion and fall of pudendal hair were noted.

Simmonds also refers to a third case of hypophyseary cachexia in a girl of 9 with a basophilic adenoma of the hypophysis, a temporary polyuria being the only clinical symptoms. W. A. BRECKMAN.

BLOOD

Beuttl, M. Importance of the Lymphocytosis of the Blood (Importancia de la linfocitosis de la sangre). *Rev. Arg. med. Argent.* 916, XII 54.

Beuttl thinks that lymphocytosis *per se* does not call for specific treatment. In a syphilitic patient without symptoms, with the Wassermann and Nonne-Apert reactions negative, but with lymphocytosis in the blood nothing can be deduced from this sign. In the case of a patient without specific symptoms showing neither globulinuria, nor cellular modification in the cephalorachidian fluid, and the two Wassermann reactions negative and with lymphocytosis alone in the blood, this picture is not sufficient to affirm syphilis. W. A. BRECKMAN.

Friedmann M: Intravenous Continuous Infusion at the Front (Ueber Intravenöse Dauerinfusion im Felde) *München med Wkchr* 1916 lvi 553

Friedmann cites Garré Nowakowski and others whose experience is that subcutaneous infusion of salt solution fails in war surgery at the front. His own experience is similar and he has given up that method and used continuous intravenous drip infusion for more than a year and has obtained much better results. The method is illustrated by citing a case of severe gluteal region grenade wound the patient blanched and almost pulseless. The cubital vein is at once opened there being no necessity for anesthesia. A glass cannula is sutured into the vein and the infusion dripping is regulated by means of a Martin glass ball apparatus. When the pulse is felt the drip is regulated to 200 per minute. The operation is then proceeded with.

The rate of drip is varied from 30 to 200 per minute after the operation according to the condition of the pulse and diagen stropanthin or adrenalin can be added or isotonic sugar solution may be used instead of the saline. Not more than four to five liters of water should be used in from twelve to twenty hours. W. A. BRENNAN

Miller G I: Blood Transfusion *Long Island M J* 1916 189

In the hope of finding a method of performing blood transfusion which would overcome all objections to the excellent syringe method of Lindeman the author devised a valve, which consists of a central body a cylinder 1.5 in. long and 0.5 in. in diameter with two arms extending in opposite directions. On the upper surface is a thumbscrew arrangement which slides back and forth on an internal fitting which has two grooves of the same size as the lumen in each arm. From the under surface of the central body a cylindrical stem just large enough to receive the tip of a Record syringe projects downward one inch.

The two arms are connected to pieces of 12 F rubber tubing 3 in. long. In the distal end of each tube a metal tube is inserted, which fits the cannula and needle used for transfusion. By moving the thumbscrew back and forth the current can be directed into either arm.

To overcome difficulties encountered in handling and steadying certain cannulae on the market the author has devised an instrument which is composed of three parts: cannula, hollow needle and obturator. The needle and obturator fit snugly and telescope into the cannula. The obturator and cannula are of equal length 2½ in. The hollow needle is one half inch longer and is slightly grooved and bevelled to a fine point. Three-quarters of an inch from its distal end the cannula is encircled by two rings. The space between is just wide enough to receive a suture which is temporarily placed by being passed through the

skin to hold the cannula in position preventing it from being shoved back and forth during the aspiration and injection of blood.

The cannula, telescoped by the needle bevelled point upward is pushed through the skin and into the lumen of the vein for about a quarter inch and the needle is withdrawn for a short distance to prevent puncturing the vessel wall. The cannula is then driven into the lumen of the vein until the ring on the cannula meets the skin. When blood is observed coming through the needle the needle is withdrawn and if the cannula is not against the wall of the vein the blood will flow freely. The obturator is then inserted and a suture passed through the skin and tied between the two rings of the cannula to prevent it from slipping. If the blood does not flow freely through the cannula it is withdrawn slowly a quarter inch or so.

With the donor and recipient cannulae in position the operator removes the obturators and adjusts the metal tip of the rubber tubing to the cannulae to be easily. A 10-ccm. Record syringe is filled with warm normal saline and air forced from both arms of the valve before adjusting it to the cannulae. The thumbscrew of the valve is then pushed in the direction of the donor's arm the piston is drawn very slowly and the syringe filled with blood. The thumbscrew is then changed toward the recipient's arm and the syringe emptied rapidly of blood. The operator continues to alternate the direction of the thumb screw filling and emptying the syringe without disconnecting it from the valve, until the desired amount of blood has been transfused.

ALBERT EHLENFRIED

Carter W S: An Experimental Study of the Use of Sodium Citrate in the Transfusion of Blood by Direct and Indirect Methods *S Ark M J* 1916 14, 427

Carter's experiments were upon dogs. His apparatus consisted of an ordinary pharmacist's percolator of 300 ccm capacity. This was calibrated and a perforated rubber stopper was fitted into each end. The stopper at the bottom end had a Y-shaped glass tube drawn out to form two cannulae inserted into it. The upper stopper had a bent piece of glass tubing inserted into it which served to connect the cylinder with two pressure bottles. The pressure bottles were used to control the pressure in the cylinder.

At the beginning of each transfusion 50 ccm of a 2 per cent solution of sodium citrate was put into the cylinder and the blood was drawn in by lowering the pressure bottle. For the first and second groups a uniform negative pressure was used when filling the container and a uniform positive pressure in emptying it. It became apparent that the most important factor was the length of time the blood was kept out of the body. So in the third group the blood was kept in the cylinder a uniform period of time by varying the pressure. It was found that the blood should not

be kept out of the body more than on and one-half minutes at the most.

The solution of sodium citrate was compared with physiological salt solution, with Ringer's solution, and with a solution of hirudin.

In the experiments in which sodium citrate was used in the indirect method the blood was allowed to flow through a paraffined cannula into a flask containing 25 ccm. of a per cent sodium citrate solution until the flask was filled up to the 50 ccm. mark. The citrated blood was filtered through several layers of sterile gauze wet with physiological salt solution before it was introduced into the recipient's vein. Small clots were frequently found on the gauze showing the necessity for this precaution.

It was found to be very important to have cannula large enough to give a free flow from the donor, thus avoiding delayed coagulation which occurred in the citrated blood after it had been filtered through gauze in three cases in which the flow was slow.

In Carter's experiments he found

1. That sodium citrate is a satisfactory anticoagulant when used in the cylinder of direct transfusion in a 2 per cent solution.

2. That transfusion can be continued from 5 to 3 times longer with a 2 per cent citrate solution than with a physiological solution.

3. That a solution of sodium citrate is as efficient as a solution of hirudin, as shown by the amount of blood transfused or by the time of transfusion.

4. That sodium citrate does not lessen the coagulability of the blood and is not toxic in the amount used.

5. That the coagulability of the blood is temporarily increased immediately after transfusion in which sodium citrate is used.

6. That the lethal dose of sodium citrate to dogs is about 1 gram per kilogram of body weight when dilute solutions are injected and that a concentrated solution the dose is not more than 0.5 gram per kilogram.

7. That a 0.1 or 0.3 per cent solution of sodium citrate is sufficient to prevent coagulation and does not have any toxic effect in the amount used for indirect transfusion in man. J. W. TAYLOR

BLOOD AND LYMPH VESSELS

Soubbotitch V. Traumatic Aneurysms (Aneurysms traumatiques). *Bull. et mem. Soc. d. k. de Par.* 1906, 2nd, 698.

Soubbotitch of Belgrade gives details of vascular surgery performed by him during the Serbian wars of 1902 and 1903 and also during the present war.

In all the author has operated upon 69 cases of traumatic aneurysm. The details of 45 of these were left behind on the retreat of the Serbian Army from Nish, and these, if available, will be published later. The present report therefore deals with 24 operated cases only. In these 16 important vessels were injured: 120 arteries and 32 veins.

The operations on the 61 comprised 107 ligatures—93 arteries, 14 veins, 30 angiorrhaphies—32 arteries, 18 veins—29 being partial and 3 total. 43 had operations (aneurysmorrhaphy).

The operative results are as follows:

In 7 arterial aneurysms treated by ligature, there were 56 recoveries. Improved 8 cases of gangrene. 8 deaths.

In 8 arteriovenous aneurysms treated by ligature there were 14 recoveries. Case of gangrene. 3 deaths.

In 23 angiorrhaphies for aneurysms there were 8 recoveries, 5 failures of which 1 died.

Of 9 arteriovenous phlebostenic venous aneurysms there were 5 recoveries, 3 deaths, 1 failure, and 1 unknown.

Of 4 Malas operations 1 recovered.

Post-operative gangrene developed in 6 cases. In 9 of these amputation was performed and the cases all recovered. Amputation was refused in the tenth case. Of the gangrene cases 3 occurred after ligature, 1 after angiorrhaphy.

In all there were 13 deaths, 9 after ligatures and 4 after surgery. The causes of death were aneurysm, 4 cases, secondary hemorrhage, 3 cases, pneumonia, 1 case, septicaemia, 1 case, embolism, 1 case, 3 cases.

The full details are given in the tabular statement.

As regards the Carrel operation (angiorrhaphy) in war the author says that owing to insufficient experience with it they soon came to the conclusion that in the case of this operation should be successful the case must be accepted. In his opinion the Malas operation is an excellent one and is recommended. Finally he states that experience shows that the plasticity of the healthy and non-infected vascular walls is much greater than he believed and that an injury to the endothelium can often be sutured without hemorrhage. Such sutures can offer a guarantee against secondary hemorrhage.

W. A. BRYCE

Begouin, P. and Moulins R. Arteriovenous Aneurysm of the Axillary Artery (Aneurysme artérioveineux de l'artère axillaire). *J. de med. d. Paris.* 1906, 1, 76.

The patient in this case was wounded early in August by November 3, the date of the operation, the aneurysm had the aspect of a fusiform mass occupying the summit of the axilla was pulsatile and had double bruit which was propagated in the pectoral region. The hand was cold, discolored and slightly oedematous. The operation was long and tedious. The artery and vein were ligated above and below the aneurysm prior to its excision. The compression of the subclavian artery on the first rib did not interrupt the arterial flow. After including the pectoralis major and axillary artery were temporarily ligated. The aneurysm included 3 cm. of artery and 6 cm. of vein. After excision the circulation was re-established in the limb in better mechanical condition than before the operation.

Attention is called to what the authors term the collateral sign i.e. when the circulation has attained a certain value, examination of the collateral vessels will disclose very clear pulsations over ordinarily non-pulsatile arteries. In this case the external mammary and the subscapular arteries were distinctly pulsatile. This sign when observed is a valuable indication for intervention and it is a symptom which argues well for a favorable prognosis.

W. A. BRENNAN

Séjournet Wounds of Veins (Plaies des veines)
P. 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

Séjournet does not favor compression in wounds of veins because it does not assure drainage and favors infection of the wound while allowing the risk of a secondary hemorrhage. He thinks ligation of a large vessel by bringing the return circulation to an abrupt stop in a limb exposed to infection compromises its vitality. Hence his preference is for lateral suture which only narrows the caliber slightly and re-establishes the circulation.

W. A. BRENNAN

Graf P 1 Experience with Vascular Injuries (Erfahrungen bei Gefäßverletzungen) *Beit. kl. Chir.* 916 xiviii 53

The author gives his experiences derived from 58 vascular wounds observed during the fighting around Warsaw.

In these 58 cases, 62 interventions were made three times arrest of hemorrhage in dying men 43 ligatures 5 amputations of limbs 8 suturings 3 tamponades under narcosis. The general mortality was 25 per cent. The carotid externa was ligated six times the carotid interna once and the maxillaris externa twice. Tamponade was absolutely necessary in one case. There were 15 ligatures and 3 suturings of the subclavian, brachial and cubitalis for arm wounds.

In the leg region 30 interventions were made for 29 injuries 23 ligatures — 5 amputations for infection 5 vessel suturings 2 tamponades under narcosis. Of these interventions 16 were on the femoralis — 11 ligatures 6 suturings. In 4 out of 5 interventions on the popliteal infection was already manifest and in the fifth case the patient died of secondary hemorrhage after a couple of weeks. In the tibialis ligation generally stopped the hemorrhage. In one of these cases amputation was found necessary and the patient died after a few days owing to loss of blood from the stump.

Eight arterial suturings were done without any subsequent secondary hemorrhage, infection or death. The author's experience leads him to think that vascular injuries coming to the field surgeon are under all circumstances to be considered as life endangering. In only the minority can a smooth infection free encapsulation of the blood outlet be obtained and by the development of aneurysms bleeding may continue for weeks. Every secondary hemorrhage even if slight makes an

opening up of the bullet tract imperative. This should be done even if the bleeding ceases. Later hemorrhages may be expected with certainty. Therefore it is always best under narcosis to lay bare the large vessels in suspected and particularly in infected cases.

For ligation of the vessels is the best procedure in even slightly infected cases may be sutured when the external wound is well trimmed. The vessel must be clearly separated away from the cavity by muscle suturing.

Ligation of the larger vessels must be kept up for two or three weeks especially when the collateral blood flow can be regular and checked by a proper position of the limb.

Hyperemia and the procedure of Moszkowicz are adaptable when there is a question of the development of collateral circulation.

W. A. BRENNAN

POISONS

Baxby Localized Tetanus (D. 161 localisé)
Bull. Acad. d. Méd. P. R. 1016 lxx 594

When tetanus develops it usually attacks the whole muscular system. But some cases have been noted in which it has attacked only one part of the body leaving the head free. This type has been designated as localized tetanus.

The author has found a case which he believes answers this description in a soldier who had the left leg amputated. Antitetanic serum was injected six hours after injury. The wound suppurated and there was some fever. All the usual symptoms of tetanus developed trismus dysphagia sardonic laughter pain fever and profuse perspiration and antitetanic treatment was instituted with an immediate cessation of most of the symptoms. Bacterial culture showed the pyocyanus only and inoculation proved negative. No tetanus spores were discovered.

The author while admitting the possibility of local tetanus thinks it is difficult to diagnose as tetanus these cases in which more or less extensive contractures are observed with a particularly painful infected wound.

W. A. BRENNAN

Goadby K. The Treatment of Tetanus. P. 1
Lancet Lond. 9 6 cvl 526

The treatment of tetanus is divisible into two main categories prophylactic treatment and curative treatment.

The prophylactic treatment aims to accomplish three cardinal points (1) to prevent the growth of the tetanus bacillus in the wound itself (2) to neutralize any poison formed by the organism directly it is formed and before it can attack the nerve tissues (3) to cause as little local disturbance as possible to the parts infected by the tetanus organism especially nerve trunks.

1 To prevent the growth of the tetanus bacillus it must be always kept in mind that the organism

is a strict anaerobe, and therefore free oxygen prevents its development. Wounds contaminated with earth, especially contused, punctured, or lacerated wounds, should be freely exposed to the air protected only by very thin coverings. Oxygen in the form of peroxide of hydrogen should be used freely and waste dressings must be burned at once.

To neutralize any poison formed before it becomes absorbed by the nerve tissue, a prophylactic dose of antitetanus serum should be given as soon as practicable after the injury and before any extensive wound cleaning is performed. It should be administered subcutaneously in a dose of 500 U S A. units. Since this procedure has been adopted, very few cases of tetanus have been recorded from the front.

3. Adequate and convincing experiments have proved that the tetanus toxin finds its way along the perineural lymph-channels into the central nervous system. As little local disturbance of the wound as possible is therefore indicated if any premonitory symptoms of tetanus have appeared, such as rigidity or local spasm of muscles in the immediate neighborhood of the wound, or an occasional symptom, general rheumatic pains. When definite tetanic symptoms have appeared it is highly dangerous to amputate or perform any operation which opens up the nerve trunks anywhere near the wound.

The chief points in the treatment of established tetanus are:

1. The early recognition of the prodromal symptoms. Lockjaw is nearly always a late symptom.

2. To neutralize the poison in the nerves and blood stream, and to extract such as has already become absorbed by the central nervous system.

3. To keep the patient strength up until the neutralization of the poison is effected by the natural defensive powers of the body aided by the administration of the appropriate antitoxin.

Chief among the early symptoms are local muscular rigidity and fibrillar twitchings sometimes the latter are noticed by the patient himself. In a severe and extensive wound, rigidity due to tetanus spasm may be mistaken for traumatic swelling, but the rigidity in tetanus is usually confined to muscle groups, such, for instance, as the right half of the anterior abdominal wall in a wound of the right groin, the left rectus and the external oblique being flaccid the deltoid and triceps in a wound of the upper arm.

The most important clinical treatment of tetanus is the administration of the specific antitoxin. The researches of Park and Biggs have shown the value of the intrathecal route for the administration of tetanus antiserum.

There is little advantage in administering tetanus antitoxin intravenously as well as intrathecally and from Park's experiments it appears doubtful if tetanus antitoxin enters the cerebrospinal fluid from the blood. When tetanic spasms are established,

intrathecal injection of tetanus antitoxin should be performed.

Fifteen to twenty ccm. of cerebrospinal fluid are drawn off and the serum, previously warmed to body temperature, is slowly run in by gravity 4,000 to 8,000 U S A. units according to the severity of the case.

The patient must be kept in a darkened room and the utmost quiet maintained. Any shock or noise however slight induces a spasm. Narcotics, in full doses should be freely administered, such as chloral 30 gr potassium bromide, 15 gr., every four hours, until the spasms decrease paralytic may be given in alternation. Morphia may be given in addition to the above.

J. H. SENNA.

Kuemmell Th Result of Prophylactic Vaccination Against Tetanus (Die Erfolge der Schutzimpfung gegen Wundstarrkrampf). Berl. W. Wochenschr. 9 6 14 4

Kuemmell dwells on the conservative course followed by surgeons in the early part of the war and the changes which were instituted owing to the appearance about September 1914, of gas phlegmon and tetanus. Very little success was obtained in the treatment of tetanus and the mortality was very high. Madelung showed a death out of 22 tetanus cases. In different hospitals it ran from 50 to 100 per cent. However, since the wounded have been given prophylactic intramuscular injections of 50 units of antitoxin tetanus has almost disappeared. I quote show that in one hospital out of 483 prophylactically vaccinated cases there was only one death. In one of Kuemmell's field hospitals where there were 372 wounds of a severe nature, due to grenades or shrapnel after antitoxin vaccination no case of tetanus developed.

Out of 1,355 very severely wounded cases treated prophylactically, there was only one tetanus case which was fatal. From inquiries among his colleagues Kuemmell finds that only 42 cases of tetanus were known to have developed during the past ten to eleven months although the conditions were the same as before except for the prophylactic treatment. Of these 42 cases 9 had not received prophylactic vaccine. Among 8 French prisoners whom Kuemmell vaccinated from six to eight days after they were wounded, there were 4 deaths from tetanus.

In good many of the cases that have been reported where tetanus appeared after the administration of antitoxin, the antitoxin was given very late. Protection can only be counted on for fifteen days, and if the infection is severe for more than a week. The first protective vaccination must be repeated within seven days if surgical intervention of any kind is made or is to be made. If there are further interventions it is well to repeat the precautionary injection. Kuemmell thinks that the relatively small number of failures after protective

inoculation will be reduced with the perfecting of the serum inoculation technique and avoidance of errors in its administration as well as the early treatment of all suspected cases.

There is only a comparatively small number of individuals who are especially susceptible to the tetanus poison, and for whom prophylactic treatment is of little avail. For the treatment of tetanus itself no good results follow any known treatment and thus the practice must be to immunize the body against the working of the tetanus poison.

W. A. BREXMAN

Robertson H. E.: The Present Status of Magnesium Sulphate in the Treatment of Tetanus
Arch. Int. Med. 1916 xvii, 677

Robertson gives a comprehensive review of the clinical reports of the use of magnesium sulphate in the treatment of tetanus. From a careful study of the individual reports it is readily apparent that antitetanic serum not only holds a valuable place in the treatment of all cases of tetanus but also that the administration of magnesium sulphate by intralumbar injection has brought about a definite decrease in the percentage of deaths from tetanus. The same may be said of the subcutaneous method but the intravenous method has been disappointing.

The deleterious effects of magnesium sulphate is an important factor in its administration. An overdose may result in sudden death from its effect on the heart or its centers in the spinal cord. This accident has not followed the subcutaneous method and as death takes place instantly there is no treatment. The most frequent bad effect is from depression of the respiratory center, this can be combated by the administration of calcium chloride 50 cc. of a 2 per cent solution into the muscles. Physiological salt solution would rapidly give relief or the administration of 1 mg. of physostigmin or eserin. The good effects of these drugs are not so apparent when the magnesium sulphate has been given by an intralumbar injection, and it was suggested to wash out the subarachnoid space with normal salt solution.

He quoted Meltzer as suggesting the following dosage. Intraspinal, 1 cc. of a 25 per cent solution for every 22 pounds of body weight. Subcutaneous 12 cc. of 25 per cent solution per kilo. As the subcutaneous injection is painful it may be necessary to precede the injection by some local anesthetic as novocaine.

D. L. DESPARD

Emery W. D.: Some Factors in the Pathology of Gas Gangrene
Lancet Lond 1916 cxc, 948.

Gas gangrene is described as the most interesting disease of the present time. It is of equal interest to the surgeon and pathologist. To the latter it is of special interest because it is a disease caused by an organism most virulent under certain conditions and absolutely non pathogenic under others.

The disease may appear in a slight wound and the part may become gangrenous in as short a space

of time as two hours when it emits a peculiar disgusting odor. This odor may be thrown out by the body of the wounded and the nurses have become so sensitive to its presence that they recognize it as the death smell. Death may take place with profound toxic symptoms in thirty hours. It is apt to develop much later at the base or after arrival in the home hospital. The amount of gas varies. The worst cases show but little or no gas in the tissues. In others there is much gas under tension so that the tissues crackle on palpation. The lesion may be local with sloughing when there is no toxæmia present.

The symptoms of gas gangrene are induced by a bacillus which is almost devoid of pathogenic powers first described by Welch as the bacillus aerogenes capsulatus it is more commonly called in England the bacillus perfringens. Though an anaerobe it is not strictly so. It grows in milk the cream at the top acting as a seal to prevent access of oxygen. It forms spores on media which contain proteids by preference. When grown on media containing glucose it forms enormous quantities of gas without depositing spores. The bacillus is but slightly pathogenic for rabbits a trifle more so for guinea pigs and is equally non pathogenic for man in whom it is a normal inhabitant of the alimentary canal causing no harm. Furthermore it is present at a certain stage in almost all wounds giving rise to no special pathogenic effects and this is especially true when the organism is present alone and unmixed with streptococcus or staphylococcus infections. Cases of hæmorrhax and wounds of the knee have been known to recover where the organisms were found in vast numbers and where there was no rise in temperature. Such contradictions have caused observers to wonder if the Welch bacillus is actually the cause of gas gangrene. All evidence points to the origin of gas gangrene from this bacillus however. The bacillus of malignant œdema is at times associated with it but its presence is difficult to detect. The mixed infections studied are not specially concerned in the development of gas gangrene.

Why is it that gas gangrene fails to develop in all the wounds in which its presence has been demonstrated? (1) We know that the bacillus is killed by the blood serum and plasma. (2) The toxin of the bacillus will inhibit emigration and kill leucocytes when present in large amount. (3) In cases of gangrene millions and millions of bacilli are found but very few leucocytes. (4) Dead and lacerated tissues, thoroughly inoculated with dirt and a large blood-clot are usually found in the worst of the war wounds such as shell wounds. In such wounds bacterial growth will take place unrestrained and if there is no free escape of the toxin it will accumulate to such an extent that when it soaks through into the healthy tissues the leucocytes are killed on the spot growth continues and spreading gangrene is set up. This condition is facilitated by interference with the blood supply. This may

explain the reason for the frequent appearance of gas gangrene in the forearm and leg in which the muscles are enclosed in fibrous aponeuroses in which they are rapidly strangled if swelling takes place therein. (5) Another point to be mentioned is the fact that the toxin, when it reaches vein causes thrombosis, and the vascular supply is still further interfered with. (6) The mere presence of devitalized tissue is not sufficient to give rise to the alarming symptoms of gas gangrene but its presence in the absence of drainage offers a bad prognosis.

As to treatment early drainage removal of clot and dead tissue encouragement of the circulation re-establishment of tissue surfaces to health by the use of hypochlorous solution, and promotion of lymph lavage by hypertonic solutions, are the best methods of treating wounds with gas gangrene or those that are threatened with this virulent infection.

LOUIS A. LAQUER.

Ritter. Gas Burns (Ueber Gasbrand). *Beitr. Hl. Chir.* 9 5, 1911, 47.

Ritter gives his experience regarding the frequent wound infections due to the gas bacillus and which he terms gas burns. The disease is characterized by the formation of gas and by the burning up of the tissues. It should not be termed gas phlegmon (connective-tissue inflammation). Inflammation and suppuration usually accompany the injury but are not a necessary part of the clinical picture. The disease is caused by an anaerobic gas-forming bacillus. Ritter thinks it necessary to emphasize the liability to direct infection from the disintegrated matter of dead bodies lying near the trenches.

Gas burns may be noticed very soon after the onset of an injury. The author has found it twelve hours afterward. There are two forms the epifascial type which develops usually without danger and the subfascial which is always serious. Death may result but this is due not to sepsis, but to blood infection caused by invasion of the bacillus.

The infection may be strictly local and many of the worst cases are of this type. Such local infections are characterized by an abnormally high number of thromboses in the beginning of the process. Although such local infections are most frequently situated in the extremities, Ritter has found them in the brain, lungs, etc.

In 1,900 injuries he observed 43 cases of gas burn 2 were in the lower extremities 6 in the upper 7 in the breast, neck, and abdomen 4 in the brain 4 in the lung.

Ritter figures his mortality in these cases as 43.9 per cent. According to Kuenmell about one third of gas burn cases are fatal. Ludeck had a mortality of 85 per cent and Franks 53.4 per cent. When death occurs it is usually on the second or third day after the first symptoms are noted.

The treatment varies. In light external cases broad incisions usually give good results. Even in cases of deep-seated injuries repeated incisions with

chemical agents will mostly effect a cure, but the incisions, etc. must be thorough, and all pockets necrotic areas, etc. must be thoroughly opened up and excised.

Of 5 cases thus treated by Ritter he lost only one.

As a prophylactic the author recommends Bier's passive treatment.

If thinks the best results are obtainable from combining free incisions with the Aetix method. His procedure is to widely open up the orifice of the wound and clean away all debris so that nothing but fresh tissue is left. The trajectory of the bullets, etc. are also opened up as far as possible. All openings are thoroughly washed with soap and hot water.

The soap is rubbed in to the tissues and rinsed away with water. By this treatment the author had success in some advanced cases which did not present themselves for twenty-four to thirty hours after injury. He emphasizes the necessity for radical excisions in such cases.

W. A. BREWSTER.

SURGICAL ANATOMY

Roux, P. and Jones, F. S. The Protection of Pathogenic Micro-Organisms by Living Tissue-Cells. *J. Exp. Med.* 9 6, 1911, 601.

The authors point out that there are a number of important diseases among them leprosy tuberculosis, gonorrhea, Leishmania, caused by microbe parasites which live more or less habitually within tissue cells. The part played by the host cells in the life of such micro-organisms and also in the distribution within the body of the diseases they induce has obvious importance. They found that it was impossible to make direct *in vitro* tests with the micro-organisms mentioned and the cells in which they live for the reason that they fail to give rise to circulating antibodies active enough to be suitable for the tests. But the problem can be approached, they found, by means of artificial systems, for example by submitting leucocytes that have ingested bacteria to a bactericidal serum and observing its effect on the intracellular organisms.

Their experiments had led to the discovery of a protection against a foreign antiserum, protection against an inorganic disinfectant and homologous antiserum and from their work a number of facts seems proven.

Living phagocytes are able to protect ingested organisms from the action of destructive substances in the surrounding fluid, and even from strong homologous antiserum.

1. There is evidence that the protection by phagocytes is largely if not entirely conditioned on their being alive.

2. These facts should be taken into consideration in the study of diseases caused by infectious agents capable of living within tissue-cells.

But they finally point out that it remains to be determined how far the protection of micro-organisms by living tissue-cells, especially cells incapable

of killing the micro-organisms is important in disease processes. The phenomenon may have much to do with the survival in the animal body of organisms such as the leprosy bacillus which is so often found living within cells of the fixed tissues and it may serve to explain in part the therapeutic difficulties in such instances. It may throw light further more, on the formation of new disease foci at points of injury in individuals of high general resistance. For if an infective agent can be walled off from the action of the body fluids by the protoplasm of a single cell containing it there is no reason why it should not be carried unharmed wherever this cell goes.

GEORGE E. BRILLAY

Robertson, T. B., and Burnett T. G. The Influence of Tethelin and of Other Alcohol Soluble Extractives from the Anterior Lobe of the Pituitary Body upon the Growth of Carcinomata in Rats. *J Exp Med* 1916 xliii 63.

One of the authors recently succeeded in isolating the growth-controlling principle, tethelin, from the anterior lobe of the pituitary body. The methods of isolating the substance its chemical properties and physiological actions and the evidences of its identity with the growth-controlling principle have already been published. It has also been already pointed out that the hypodermic administration of emulsified tissue of the anterior lobe of the pituitary body to rats either directly into or in localities remote from the tumors, leads to a remarkable acceleration of the growth of the Flexner-Jobling carcinoma, especially during the period of growth between the twentieth and thirty seventh days succeeding inoculation. This effect is specific since similar administrations of liver tissue during the same period far from causing any acceleration of the growth of the tumors actually resulted in a slight but definite retardation of their growth.

In view of these results it appeared of importance to ascertain whether tethelin also reproduces the effect of the whole anterior lobe upon the growth of carcinomata, and to that end the investigations which are about to be described were undertaken. At the same time it seemed advisable to the authors to ascertain whether any other alcohol-soluble extractive of the anterior lobe of the pituitary body exerts any action upon the growth of carcinomata. Three such fractions were prepared and their action upon the growth of carcinomata was investigated, with the following results:

1. The hypodermic administration of tethelin increases markedly the rate of growth of the primary tumor and the tendency to form metastases in rats inoculated with carcinoma in this as in other respects, reproducing the action of the whole anterior lobe of the pituitary body.

2. Other alcohol-soluble extractives of the anterior lobe of the pituitary body with the exception of the lecithin fraction, exert no appreciable effect upon the growth of carcinomata in rats.

3. The lecithin fraction as in previously reported

experiments in which the authors employed lecithin obtained from eggs causes evident retardation of the growth of carcinomata in rats.

GEORGE E. BRILLAY

Higgins H. L. Peabody F. W. and Fitz, R. A. Study of Acidosis in Three Normal Subjects with Incidental Observations on the Action of Alcohol as an Antiketogenic Agent. *J Med Res* 1916 xvi 3.

The authors call attention to the fact that it has long been known that the administration of a carbohydrate free diet causes the development of a moderate acidosis in normal persons. The experiments in this paper were designed to obtain further data primarily on the production of acidosis induced by a carbohydrate free diet and its effect on the metabolism of normal individuals and incidentally on the action of alcohol on such an acidosis. The subjects made use of were three healthy men between the ages of 25 and 33 years. The diet which consisted chiefly of eggs, butter, meat, fish and sugar free cream was practically carbohydrate free. It was prepared with great care in the diet kitchen of the Peter Bent Brigham Hospital, under careful supervision and was served in an appetizing manner. The subjects endeavored to eat about 3500 calories per day, largely of fats with the idea of getting a high degree of acidosis but they did not relish so much food and on some days could not take it all. The general plan was to make observations on the gaseous metabolism and urine on one day when the men took an ordinary mixed diet then on three days with carbohydrate free diet then on one day with carbohydrate free diet plus whiskey and finally on a sixth day a diet with the same protein and caloric content but with much of the fat replaced by carbohydrate.

Total nitrogen in the urine was determined by the Kjeldahl method. Urinary acidity and ammonia were tested by Folin's methods. The hydrogen ion concentration of the urine was determined by the method of Henderson and Palmer. Acetone was distilled by a method suggested by Scott Wilson and titrated by the Messenger method. β -oxybutyric acid was estimated by the Shafer and Marriott method. Bang's micromethod for blood sugar was used and Marshall's urease method for blood urea. The alveolar air was taken by the method of Haldane and Priestley with a Siebeck valve. Four samples two at the end of expiration, and two at the end of inspiration were taken before and after the morning and afternoon metabolism experiments and just before the subjects went to bed at night. The gaseous metabolism was determined by means of the Tissot spirometer and the Haldane gas analysis apparatus.

In three healthy subjects a carbohydrate free diet caused the development of varying degrees of acidosis. The acidosis was shown by a lowered CO_2 tension of the alveolar air by an increased urinary excretion of ammonia nitrogen and of

acetone bodies, and by the increased titrable acidity of the urine. The acidosis was accompanied by subjective sensations of malaise, an increased oxygen consumption a negative nitrogen balance increased pulse-rate and increased ventilation. Alcohol given to the subjects on this diet in dosage comparable to that used for clinical purposes did not stop the progress of the acidosis or show any antiketogenic action. Coincidental with its administration there was further increase in the oxygen consumption and in the disagreeable subjective symptoms.

GEORGE E. BEERY

Pellegrini E. Intestinal Function in Pancreopathic Conditions (Fondazione testuale pancreopatica) *Chir. med. ital.* Milano, 9, 5, li 65

The pancreatic function must be studied in two ways according to the fluids which pass from the gland into the intestine and according to the wider and more general action which the products of intestinal secretion exercise on the organism.

The author states that a thorough investigation of pancreas functioning has been carried out in Magrignano's clinic in the University of Genoa. The results from various standpoints will be published from time to time. The methods of research are described in great detail as well as the clinical histories of ten patients and some controls, the results being elaborately tabulated.

From the results the author draws these conclusions:

1. In determinate pancreatic lesions the coprologic tableau is constituted as follows: (a) stools rich in water with abundant alimentary residues excessively steatorrheic with desquamatory elements (b) stools deprived almost wholly of sterco bilin with a reaction principally alkaline (c) stools rich in unmodified albuminoid residues (d) stools with augmentation of undigested carbohydrates, (e) the formula of fatty matters almost universally inverted the quantity of neutral fatty matters prevails considerably (f) digestion of the nucleus of ingested meat completely suppressed.

2. The coprologic picture shows that in pancreatic disease elimination of water is profoundly modified proteolytic, amylolytic, and especially steatorrheic powers are greatly diminished the nucleolytic power is lowered the external functions of the pancreas are totally compromised.

3. Reciprocally it is certain that the index of the lesions or the insufficiency of the pancreas must be sought in the diminution of the digestive power especially for fats, and in the diminution of the nucleolysis of ingested meats.

W. A. BRENNAN

Auer J., and Maltzer S. J. The Intravenous Injection of Magnesium Sulphate for Anesthesia in Animals. *J. Exp. Med.* 19 6 xiii, 64

The effect on animals of intravenous injections of magnesium sulphate was investigated by the authors about ten years ago and its use in this way in

general was discouraged. However a series of experiments made by the authors with intravenous injection of magnesium sulphate in cases of experimental tetanus, and the meager but satisfactory experience which Kohn and Straub had with the employment of this method in cases of tetanus in human beings, induced the authors to take up the experimental study in animals of the employment of magnesium sulphate by intravenous injection for the purpose of producing anesthesia. This was done as a preliminary test for the desirability of studying the exclusive use of intravenous injections of magnesium sulphate as a means of producing or at least inducing anesthesia in human beings. Their experiments seem to justify the following general conclusions:

1. By the intravenous injection of 4,1,000 magnesium sulphate into dogs at a certain rate a stage can be reached where the abdominal walls are completely relaxed and when section of the abdomen and stimulation of sensitive parts of the peritoneal peritoneum do not produce pain or elicit any reaction of the animal. At the same time spontaneous respiration may still be maintained within normal limits and the lid reflex be fair or even normal. In this state intratracheal intubation for artificial respiration can be easily accomplished. This stage may be attained in twelve to fourteen minutes when the rate of injection is about 3 ccm per minute. When this stage is attained the rate of injection should gradually be reduced otherwise sooner or later spontaneous respiration will be abolished and by a further maintenance of the rate of injection all the skeletal muscles may become paralyzed.

2. When the injection of magnesium is continued for a longer period, the paralytic effects of the magnesium injection will set in even when administered at a slow rate.

3. The paralysis of the respiratory function is readily met by intrapharyngeal insufflation which is easily executed even without training in this procedure or by the method of intratracheal insufflation, if executed by one trained in its management.

4. When the respiration of the animal is accomplished by insufflation, the paralytic effect of the magnesium may be abolished fairly rapidly by an intravenous injection of about 5 ccm of an 8,1,000 calcium chloride solution or it may disappear slowly after the infusion of the magnesium solution is discontinued for some time. The latter mode of disappearance may be favorably accelerated by an intravenous infusion of 60 to 100 ccm. of a 4,1,000 solution of sodium sulphate.

5. The production of anesthesia by intravenous injection of magnesium sulphate should not be undertaken unless an apparatus for intrapharyngeal insufflation is at hand because in exceptional cases the disappearance of spontaneous respiration may be one of the earliest consequences of the magnesium injection.

6 The injection of calcium chloride should not be employed in cases in which the subject shows cardiac insufficiency. In such instances moreover injections of magnesium should not be used for the purpose of anesthesia at least not until greater experience has been acquired in the employment of this method.

GEORGE E. BEILBY

Pellegrini E. Stercobilin (Sulla stercobilina) *Chimica Medica* Milano 916 li. 791

Pellegrini presents some of the results obtained in experimental researches on intestinal function carried out at Maragliano's clinic in the University of Genoa.

The results were obtained from observation of patients in whom there were more or less notable gastro-enteric disturbances. The methods followed for the estimation of urobilin in the urine were those of Mareschal Huppert and Hammarsten and for biliary pigments those of Gmelin and Nencki. Gmelin's method of blood examination was followed.

The results show that there is an agreement in the conditions of elimination between stercobilin and urobilin in conditions in which these pigments are eliminated normally. This normal urofaecal elimination exists in spite of disturbances of the digestive apparatus caused by gastric, enteric, cardiac and other lesions. In hepatic lesions stercobilin diminishes rapidly until only minute traces are left and icterus may or may not be present. In such patients the elimination of urobilin takes the form of pathologic urobilinuria and this is particularly noted in the case of pancreatic subjects.

The facts appear to show that hepatic conditions notably influence the elimination of urobilin and that in cases where stercobilin is absent the elimination of urobilin is pathologic. W. A. BRUNNAN

Gates, F. L. and Meltzer, S. J.: An Experimental Study of the Additive and Antagonistic Actions of Sodium Oxalate and Salts of Magnesium and Calcium in the Rabbit. *J. Exp. Med.* 1910 xlii 655

On the basis of the hypothesis that magnesium favors inhibition of the various functions of the nervous system, Meltzer and Auer studied extensively the action of magnesium salts upon various animals. In injecting magnesium sulphate subcutaneously they found that a certain dose which varies with the species of animals is capable of producing profound anesthesia and paralysis from which the animal recovers. For rabbits this dose amounts to about 1.5 gm of magnesium sulphate ($MgSO_4$ and 7 H_2O) administered in a molecular solution. Larger doses cause the death of the animal as a rule by respiratory paralysis. With an effective but non-fatal dose in subcutaneous injections the development of the depressing inhibitory effect is gradual and fairly slow.

In the course of their studies Meltzer and Auer found that calcium which is chemically closely

related to magnesium is biologically apparently the antagonist of the latter. When calcium is injected intravenously shortly before or immediately after the respiration stops into an animal which has received a fatal dose of magnesium the animal will recover in less than a minute provided of course that the circulation is still effective during the calcium injection.

The problem which the authors have endeavored to solve experimentally in this study is: Can the depressing component of the calcium precipitating oxalate be brought out by a simultaneous administration of a subminimal dose of a magnesium salt? Their experimental study seems to have firmly established the following facts:

1 Subcutaneous or intramuscular injections of sodium oxalate in subtoxic doses when administered to an animal which has received a subminimal dose of magnesium sulphate produce profound anesthesia and paralysis of long duration although the usual effects of sodium oxalate alone are of a stimulating character. This fact is in general in harmony with the results reported by Starkenstein who however seems to have used the combination of the two salts in one solution namely that of magnesium oxalate.

2 The combined injections of subminimal doses of sodium oxalate and magnesium sulphate produce a strong reduction or even at times a complete abolition of the conductivity of the motor nerve endings.

3 An intravenous injection of calcium salts brings on a recovery from the profound and prolonged effects of the combined action of sodium oxalate and magnesium sulphate which is as prompt action as is observed in experiments in which effective doses of magnesium alone are given. This fact is the more noteworthy since depressions of long duration produced by prolonged continuous injections of magnesium solutions alone do not respond very promptly and effectively to calcium injections.

As will be recalled the starting point for this investigation was the hypothesis that substances which are capable of precipitating calcium—a biological antagonist of magnesium—ought to be capable of increasing the depressive effect of magnesium. The authors' experiments proved that this assumption was correct. This would seem therefore to justify the interpretation that the augmenting action of sodium oxalate has its cause in the ability of the latter to precipitate calcium and thus increase within the body the amount of unantagonized magnesium. However they state expressly that this view is for the present still no more than a hypothesis and does not exclude other possible interpretations of the facts. As they pointed out it speaks against this hypothesis that oxalates do not produce phenomena of depression the toxic symptoms produced by oxalates exhibit distinct signs of increased and not of decreased irritability.

GEORGE E. BEILBY

Lewis, D. The Appearance of the Precursor Substance in the Fetal Hypophysis. *J. Exp. Med.*, 19 6, xiii, 677

It has been demonstrated that the precursor substance of the posterior lobe of the hypophysis is secreted by the pars intermedia, a derivative of the pharyngeal pouch. The present study was undertaken by Lewis with the hope of determining at what period in fetal life the precursor substance appears and of correlating the cytological changes in the pars intermedia with the establishment of secretory function using the appearance of the precursor substance as an index. He found that the hypophyses of pigs just before birth were large enough to permit of separation of the two lobes, but in the earlier stages this was impossible. In order to secure uniform material for injection the extracts were made from the entire gland in all instances. The glands were obtained fresh and extracted in absolute alcohol to remove the depressor substances. After extraction was completed the alcohol was filtered off and the residue dried in a desiccator. The dried residue was kept in small bottles until desired for use when a salt solution extract was made for intravenous injection.

As a result of his experiments Lewis concludes that the precursor substance of the hypophysis is so marked in the pig fetus measuring 175 mm. that it seems probable that a fetus of this length is independent of the secretion of the mother's hypophysis.

GROSV. E. BISSON

Alberti, O. Tubercular Bacillæmia—A Clinical-Experimental Study (*Staph. bacillus tubercularis*). *Clin. anal. Biol. Milano*, 9 6 II 15

A question which has occasioned a great deal of discussion in recent years is that which refers to the presence of the Koch bacillus in the circulating blood of individuals attacked by tuberculosis. The author reviews the voluminous literature commencing with Willemin's animal experiments in 1868 down to the present time. In his opinion the discord which exists in the findings of the different authors is to be explained by faulty methods in the technique employed.

He, therefore, undertook to carry out a series of experiments following a rigorous technique designed to exclude possible sources of error. He examined the blood of 50 individuals, of which 30 were unquestionably tuberculous, 10 were suspected and 10 were clinically healthy. In 35 cases the complete research was made double microscopic examination by the methods of Staubli-Schnitter and Rosenberger; and parallel with this a biologic test comprising inoculation of the blood in the peritoneum of guinea pigs.

In the other 15 cases the research was limited to the biologic test alone. Bacterioscopic examination in the 35 cases gave 5 positive results with the Staubli-Schnitter method and 3 with the Rosenberger method.

Biologic tests in the 50 cases and with 78 guinea pigs have given 11 manifestly positive results. Commenting on these results the author thinks that tubercular bacillæmia is met with very infrequently and is only manifested in tuberculous individuals it is an inconstant and transitory phenomenon which ought not to be considered—at least as far as chronic tuberculosis is concerned as a true septicæmia, but simply as a bacteræmia of little clinical importance. Tubercular bacillæmia has no relation to the degree of gravity of tuberculous lesions and has no practical value from either the point of view of diagnosis or prognosis. W. A. BROWN

Descomps, P. Epiploon and Pericolicitis (Epiploon et pericolicite). *Rev. d. chir.*, 19 6, xxv, 109.

For some years past many articles have been written on the rôle of pericolicitis in the pathogenesis of chronic colitis and stasis. Inflammations and stasis in the colon usually localise in certain so-called "hot spots," the terminal ileum and initial segment of colon, the transverse colon, and colonic angles.

In this large territory there is a special segment in which inflammation and stasis occur in the majority of cases. This is the right colonic segment. The anatomico-physiological conditions found there are of capital importance and show the part played by the epiploon and therefore by epiploitis in the production of pericolicitis and consequently of colitis and stasis in this segment.

The author therefore devotes the greater part of his article to a study of the anatomy of the epiploon including the arteries, veins, and lymphatics.

Walther and his pupils have at various times from 1868 to the present shown the connection of epiploitis and chronic colitis, and Descomps himself basing his remarks on 36 observations of Walther has shown the preponderant part played by the epiploon in the pathogenesis of pericolicitic phenomena and the favorable effects produced by epiploic resection and liberation of pericoliconic adhesions as a complement to appendectomy.

There are two ways in which the epiploon may be involved. First, by the formation of adhesions with the neighboring organs and especially with the right colon. Such adhesions may be primitive, i.e. anatomic in type, or they may be pathologic, inflammatory adhesions. Of this latter type are the restricting bands, derived from the epiploon, which give rise to the so-called membranous pericolicitis. The second way in which the epiploon may be involved is less known but not less important. It may become inflamed and sclerotic without forming pericoliconic adhesions. The loss of suppleness and mobility of the epiploon gives rise to pericolicitis and stasis. This type is frequent and in the most recent statistics of Walther this non-adherent type was found 19 times as against 8 of the adherent type.

W. A. BROWN.

RADIOLOGY

Boggs, R. H.: The Treatment of Epithelioma of the Lower Lip. *Internat Jt J* 1916 XXII, 114.

Epithelioma of the lower lip however innocent in appearance is nevertheless cancer and often shows a degree of malignancy that is not usual in epithelioma in other situations. It seems to be rather a regional than a local lesion. The lymphatics which drain it should in every case receive the same attention as the visible lesion. Until recently the best routine treatment has been early surgical removal of the ulcer and lymphatics. Today the general practitioners commonly refer lower lip epithelioma to a radium therapist because they can be successfully treated by this method.

At first pioneer work had to be done and the disappointments were many. Radium was scarce the apparatus elementary and the limitations many and serious. Only cases of which surgery despaired built their last hope on radiotherapy. The results were necessarily uncertain and a severe test of the new medical faith and hope. Yet there were excellent results that justified the hope of the physician and the confidence of the patients. In consequence with our present supply of radium the powerful transformer and the Coolidge tube we now stand on firm scientific ground and radiotherapy has a definite place in the treatment of malignancy. To-day the radiotherapist has a broad and on winning clinical knowledge of his subject. The author is convinced that at present radiotherapy is the best routine treatment for epithelioma at any stage and he also believes that this will be the ultimate decision of every modern physician. He wishes however to caution against haggling radiotherapy of lip cancers as much as against haggling surgery of them. Radiotherapy to be reasonably successful, demands competent application. Radiotherapeutic treatment of lower lip epithelioma was discussed at a recent meeting of the American Dermatological Society and it was agreed that it is a legitimate and successful treatment in properly qualified hands. That epithelioma can be eradicated by radiotherapy has been definitely proved and in advanced cases it offers more hope than any other method. Cures have been effected in far advanced cases but the sooner a precancerous change is treated the better prophylaxis always being the safest and the surest. It is only fair and just however that at present no one should attempt this treatment without adequate previous training and experience under proper direction.

The technique must in every case be adapted to the individual patient and his needs. Scientific dosage is a matter of physics and of therapeutics. Physical dosage can be measured exactly but therapeutic dosage depends on the technical and practical judgment of the physician. As an instance in point the author prefers radium used locally for epithelioma of the lower lip and for the adjacent glands radiation with the Coolidge tube. One

capsule is placed inside another on the lip and another on the outside of the lip to secure complete irradiation. Usually the first reaction is sufficient for healing a moderate lesion but the scar must be healthy pliable without retraction and without ulcers before a case can be considered clinically cured. The treatment of the adjacent glands must never be neglected even for the small lesion. Any partial removal of an epithelioma must be condemned.

The author's conclusions are as follows:

1. Every cancerous epithelioma of the lower lip is to be treated because experience has shown that this epithelioma is a regional rather than a local lesion.

All precancerous lesions should be treated by a method that leaves no scar whatever.

3. Many hold the result of radiotherapy to be as good and even better than that obtained by surgery and that surgery should be resorted to only in selected cases.

4. There are a number of radiotherapists who have had sufficient experience with epithelioma of the lower lip and who have obtained results that justify them in considering radiotherapy a perfectly legitimate method of treatment.

5. Inefficient work as it is being done by those who have simply bought the usual apparatus and received some instructions in its use from the manufacturers cannot be too emphatically condemned nor too strongly deprecated.

Boggs, R. H.: The Treatment of Tuberculous Adenitis by Roentgen Rays. *Int Jt J* 1916 XXII, 106.

As the end results in cases of tuberculous adenitis treated by the roentgen rays are generally satisfactory, Boggs believes many cases that are subjected to surgical procedure could be better treated by radiation thus sparing the unsightly scarring with the not infrequent sinuses which when long delayed in healing are often finally referred to the radiologist. As is well known operation is often followed by local recurrence and at times gives rise to a general tuberculosis of the diseased glands often being of wider distribution than the clinical signs indicate making it difficult and at times impossible to remove them. The contrast is marked and it is alleged 90 per cent of these cases are permanently cured by radiation, it would seem that this method should be adopted as a routine. Radiation in these cases should not be confused with that employed in the treatment of malignancy, and while hard rays are to be used they should not be given in massive doses as the general system must dispose of the products of degeneration and it is better not to overload it, especially when as a rule it is greatly impaired.

Since the rays are not bactericidal the beneficial effect must be produced by destroying tissue of low resistance thus rendering the soil barren but attention is called to the fact that Crane has advanced the theory that by this process an autogenous

vaccin is set free and this is given in explanation of those instances where a tuberculous process at some distant point from that treated will likewise disappear. The observation has also been made in cases where tubercle bacilli have been found in the sputum, subsequent examinations failed to show their presence. While treating these cases, especially those about the neck, careful inspection must be made for local sources of infection in the mouth and throat, bad teeth, and swollen tonsils but it is by no means necessary to remove every swollen tonsil for many will improve after the glands subside. When a chain of lymphatic glands has been properly rayed the glands and vessels undergo a fibrous degeneration with almost entire obliteration, with no marked influence upon the surrounding tissues. Attention is called to a series of 344 cases collected by von Mutschersacker where operation was found necessary in only 9 per cent. Mathews is also quoted and his view some against operation is given. Boggs has also considered the possibility of mistaken diagnosis but calls attention to the fact that such conditions as Hodgkins disease and sarcoma also call for radiotherapy.

W. S. NEWCOMB

Gerber I. The Use of the Polygram in Gastro-duodenal Diagnosis. *Am J Roentgenol* 9 6 13, 20.

Gerber for the past several months, has been using the polygram method of Levy Dorn modified somewhat by the use of modern instrument and technique and has found it almost indispensable in gastroduodenal examinations. He makes only two exposures on a single plate, with an interval between exposures of about eight seconds. This may be lengthened somewhat in cases with very sluggish peristalsis or hastened but when the peristalsis is extremely lively. The polygrams are made in both the erect and the prone positions.

In the normal stomach, the passage of the peristaltic waves can be seen in a most graphic manner. The two outlines cross and recross each other in such a way as to show clearly that every portion of the muscular wall is taking part in the peristaltic conduction. Thus it can be seen whether or not there is any *Beery's gulf* or regional lack of motility. In chronic gastric ulcer the area of induration will show definitely as portion of the gastric wall that does not take part in the peristaltic conduction. Craters or niches stand out prominently. Incrusts will show as a permanent in cutting easily distinguished from the criss-crossing peristaltic waves. In duodenal ulcer the characteristic deformity is sharply shown. In gastric carcinoma, both filling defects and defects of motility can be observed by this method. In noting pressure from extragastric tumors, distended gall-bladder etc., the polygram may be of considerable assist.

It might be objected that all the above information can be noted on the fluorescent screen. This

is certainly true in some cases, but in many others such as early carcinomas, small antral ulcers and some types of duodenal ulcers, the information is either very difficult or absolutely impossible to obtain from a fluoroscopic study only. Besides the polygram affords a permanent record. In other words, it offers the advantages of serial plates without the great inconvenience and expense of obtaining a large and complete series.

The author does not by any means offer the polygram as a substitute for a thorough serial study but he does believe that it will in many cases save considerable time trouble and expense for those who confine themselves chiefly to the roentgenographic method in the study of gastroduodenal disease.

W. A. E. ANDERSON

Newcomb W. S. The Comparative Value of Roentgen and Radium Radiation in Therapeutics. *Am J Roentgenol* 9 6 13, 203

Aside from the fact that roentgenotherapy has been brought to a high degree of refinement in comparison with radiumtherapy there are cases which appear to fall within the distinct province of each. In superficial epithelioma, the method which gives the best results is merely a matter of technique but in cases of carcinoma in the cavities of the body radium is without a peer.

Upon purely clinical grounds, all things being equal, the treatment of all cases may be divided into two classes.

Those in which a localized radiation is desired and in which these radio-active elements are to be preferred.

Those calling for diffused radiation over a more or less extended area in which roentgen radiation is to be preferred.

Modification must be made in both depending upon the depth of radiation desired.

It has been previously stated that the difficulty of comparing these two forms of radiation is due to the wide variation in technique but generally speaking, the results are obtained from radium with less damage to surrounding tissues than similar conditions treated with roentgen radiation.

The idea seems prevalent that enormous quantities of radio-active element are necessary to produce results. While large quantities are desirable the fact remains that a small quantity judiciously applied will often prove of greater benefit.

In conclusion it might be fairly stated that an exact comparison of the two forms of radiation is extremely difficult due to the wide difference in technique and the wide variation of results reported by various writers in both fields. This is further confused by the fact that many individuals employing these radio-active elements have had very little experience in general radiology. From the author's personal experience and observation, however, it still appears that there is and will be a field for both forms of radiation as well as a very broad common ground where both will yield results equally de-

pending entirely upon the individual technique employed.

W A EVANS

Stewart W H: Roentgen Diagnosis of Obacure Lesions of the Gastro-Intestinal Tract. *Am J Roentgenol* 1916 33: 202

The tendency of roentgenologists of today to ignore the clinical picture and depend almost entirely on the fluoroscopic and roentgenographic findings in arriving at a diagnosis has prompted the author to make a plea for the more general use of every means available in every case combining the roentgen interpretations with the symptoms and laboratory reports before an attempt at diagnosis is made. Too often what apparently was a clear case roentgenologically has been proved to be otherwise when compared with surgical or post mortem findings.

In order that it may be possible to render valuable aid in the diagnosis of gastro-intestinal lesions especially the large number of borderline cases in which the patients suffer from pain and distress in the right upper quadrant and which may be caused by kidney gall bladder duodenal or appendicular disease it is necessary that every effort should be made to educate the medical profession to refer their cases to the roentgenologist for diagnosis and not to restrict his investigations to any one part of the gastro-intestinal tract. Just as a stone in the left kidney may give rise to symptoms on the right side so may the cause of symptoms in the stomach be found in the appendix or in the lower colon. Therefore a negative diagnosis cannot be accepted as final until the entire gastro-intestinal tract has been examined.

Stewart presents a series of cases illustrating the cardinal points which he has attempted to bring out namely that a thorough physical examination and complete history together with a record of the laboratory reports be combined with the roentgen findings of a complete examination before arriving at final conclusions. This series consists of several interesting reports of cases accompanied by illustrative roentgenograms which show conclusively how the roentgenologist had been in full possession of the clinical and laboratory findings in the case would have gravely erred in his diagnosis.

W A EVANS

Holding A. F.: Roentgen Deep Therapy in Malignant Tumors. *Am J Roentgenol* 9: 63, 9

The author's report covers cases which have been observed during a period of three years including not only malignant tumors but also non malignant diseases such as lupus vulgaris keloid acne vulgaris exophthalmic goiter myoma etc. In all cases of non malignant disease, with the exception of myoma exophthalmic goiter and tuberculous adenitis and in cases of superficial malignancy the author urges the use of physical methods rather than surgical for the reason that with physical methods which include roentgenotherapy conglu-

tion and the ultraviolet light a cure is obtained with the best cosmetic result with ut hemorrhage or opening up the lymphatic vessels without pain or the need of an anesthetic and without loss of time from employment or hospital confinement. The results as shown in the tabulations are very convincing.

The author claims priority in the treatment with the roentgen ray of carcinoma testis of teratoid origin and parathyroid gland tumor with very pronounced meliorating effect.

Another group of cases in which improvements have been shown are those of intrathoracic sarcomata and arimomata. Holding urges the employment of roentgen therapy in all of these cases even the most hopeless from all a certain degree of relief can be obtained and some may be even symptomatically cured.

In summing up this series of cases the following conclusions are reached:

1. The most important point in connection with the use of physical methods for therapeutic purposes is that they aid nature to cure superficial malignant tumors much better than surgical methods.

2. Unless roentgen deep therapy it is a common occurrence to have tumors undergo retrograde metamorphosis or even to disappear.

3. In hopeless cases these physical methods enable nature to effect marked amelioration of the symptom.

4. Occasionally this amelioration of symptoms amounts to a symptomatic cure.

5. The amelioration of symptoms is distinctly worth while.

6. If these physical methods ameliorate the symptom in hopeless cases patients having operable lesions should not be denied the benefits of these physical methods after operation.

7. Two forms of tumor not previously reported in medical literature are markedly ameliorated by roentgen deep therapy namely carcinoma testis of teratoid origin and carotid gland tumor.

8. Every effort should be made to perfect the technique and the use of adjuncts to increase the number of symptomatic cures and make permanent the ameliorations.

W A EVANS

MILITARY SURGERY

Hagedorn O: Finding of Position of Retained Bullets (Steckschuesse und ihre Lagebestimmung). *Bil M Chir* 9: 61 u. 546

Retained bullets are most frequently found to be shrapnel and they are almost always found to be encysted probably owing to the inflammation caused by the foreign body aided by the blood accumulated round it giving rise to the formation of a cyst.

The first question arising is whether or not the bullet should be removed. The most important objective disturbances indicative of removal are disturbance of motor function and the signs of

vascular or nerve pressure. In the presence of such dangerous symptoms and serious functional disturbances and when the bullet can be reached without further severe destruction of tissue it should be removed.

For localizing the position of the foreign body two roentgen pictures in different projections are usually sufficient, the intersection of such projections giving the line in which the body lies, but when the bullet lies in the frontal part of the hand, in the shoulder or other positions of very irregular contour this method is unsatisfactory and the apparatus devised by Weise has in such cases given good results in the author's practice. The method is simple and satisfactory in its results. W. A. BRIDGES.

Hall, A. J., Keogh, A. H., Fletcher, E. M. *Surgery in War*. Royal Army Medical Corp. Blakiston, Son & Co. Philadelphia, 1916.

This small octavo volume of 583 pages is a summary of the surgical experiences and conclusions of the present European War by Major Hall and a number of other well-known contributors.

The author states that on the bacteriological side Sir A. E. Wright's work as shown by recent surgical developments has revolutionized the method of treating sepsis. The object of the work is to give members of the profession unacquainted with war surgery an insight into what is being done in military hospitals.

Col. E. M. Fletcher points to the definition of military surgery which is after all but the surgery of gunshot wounds, with the broad interpretation understood in military parlance viz. injuries from bombs, hand grenades, and everything set in motion by an explosive compound, as well as wounds from projectiles emanating from rifled arms, both great and small. The vast difference between civil and military surgery is due to the immense difference in the conditions under which the work is done. On the one hand there are conditions in which the environment dominates the surgeon, and on the other conditions in which the surgeon dominates his surroundings. The civil surgeon operates under conditions approaching an aseptic ideal whereas, the military surgeon's field is seldom aseptic but almost always precarious. The wounded man, though he may be fit physically is often exhausted by the fatigue and privations of campaigning when he is stricken on an infected soil on which he is apt to lie for days before surgical aid can reach him. He is next subjected to the trying influences of long and often improvised transport, during which proper food, good nursing, and favorable climatic conditions are frequently absent. The surgeon's difficulties are most trying. Hospitals have to be improvised in the beginning of the campaign. These are often overcrowded from the sudden accession of wounded, which arrive when least expected. The overcrowding often brings scarcity of food and surgical supplies. To add to the difficulties at hand, the wounds, which are all infected and in a class to

themselves, are of manifold varieties, occurring in all parts of the body and involving every tissue.

The foregoing facts justify the claim that military surgery is a special branch of surgery. Moreover every campaign has conditions peculiar to itself. These are distinguished by the moral psychology of the combatants as related to the intensity of the fighting, the numbers engaged, climatic conditions, the character of the country whether hilly or flat and above all the character of the implements employed in inflicting wounds.

In the present conflict the magnitude of the campaign has brought the virile manhood of all the countries involved to the front and with them the most capable surgeons in the world. In this little volume we find how valuable has been the assistance of the civilian members of the profession to the Director of the Medical Services of the British Army and incidentally to the medical world.

A notable point in the present war is the way in which the bacteriologist has developed his indispensable services to the military surgeon. His value to the physician and the sanitarian in campaigns had been well established but never before has the bond between the bacteriologist and military surgeon been observed. Infection and the wound have linked the two together and to achieve success they must work hand in hand. It was through the rational and indispensable work of Sir Almroth Wright and his collaborators that an effective treatment of gunshot wounds has been worked out. Failure to properly arrest infection in war wounds at the beginning of the campaign demonstrated that our antiseptic methods were at fault, and it required the steady influence of the bacteriologists to direct surgical endeavor along proper lines.

Military surgeons in the United States who treated gunshot wounds in the region of the great plains, under cloudless skies, in pure air on soil that had never been a plow were seldom troubled by the complications of varied infections. Likewise the British surgeons who followed the armies in the Boer War gained experience in infection that served no purpose when compared with that obtained in a campaign fought with a great preponderance of wet days, upon a soil artificially sown with bacteria, largely of the fecal kind. This condition has made the labors of the bacteriologist indispensable to those of the surgeon.

The nature of the weapons has played a very interesting rôle also. To future generations the present conflict will be referred to as the Great War but to the surgeon it will be known as the Pointed Bullet War. Although pointed bullets were used in the Turko-Balkan War and other minor conflicts, the present war is the first in which it has been universally and exclusively used in both machine-guns and the military rifle. There has been seen all the ugly wounding effects which were foretold as the result of experimental work. Compared to the effects of the ogival jacketed bullet of the Krag-Jorgensen type its shattering effects on bone is

better marked. Its tendency to turn an impact makes it more destructive to soft parts in the chest and abdomen. Its high velocity and flat trajectory cause explosive effects at longer ranges and it is more apt to break up. When it disintegrates after striking side on it causes wounds not unlike those caused by dum-dum bullets, a fact which has brought about charges of inhumanity on all sides such as those which have been heard at the beginning of all war ever since the advent of the high-power military rifle. Accusations of inhumanity have been made more especially against the pointed bullet used by the British army, because disintegration of this projectile shows fragments from two separate nuclei—one of lead in the body of the envelope and the other composed of aluminum occupying the point of the envelope. The British Government admitted this bullet some time ago for the reason that being a trifle longer than the other pointed bullets it offers more bearing surface against the rifle barrel and thereby is steadied in flight. It is doubtful if the mere fact of a double nucleus adds to the tendency to disintegrate. Those who have experimented with all types of pointed bullets are well aware of the highly destructive effects which have been brought about by the so-called *spite* bullet first adopted by the Germans. It is doubtful if the pointed bullet of one army is more destructive than that of another.

Another remarkable feature of gunshot wounds in the present war is the large percentage of artillery wounds from shrapnel and high explosive shells and to these might be added the wounds caused by bombs and hand grenades. Wounds from these projectiles are attended with a great deal of contusion, hematoma, lacerated and devitalized tissue. They are prone to extensive suppuration, which in turn makes their treatment difficult and laborious in active campaign.

The statistics of war wounds have been withheld by the censor so that nothing is given with which comparison can be made but assurance is given that results are satisfactory and that improvements in wound treatment are being made very rapidly.

The bacteriology of all wounds may be said to be one of environment and for that reason the bacteriology of war wounds is similar to the bacteriology of the terrain on which the battle is fought. The amount of the infecting dose will depend upon the size and character of the wound and the degree of contamination of the skin and clothing. The operations on the western front are being conducted in farming districts in which the soil is richly manured with the fecal matter of animals and man. The consequence is that the virulent types of microbes which find their habitat in such refuse are very prevalent. Broadly speaking the organisms found in the clothing, skin and wounds of men are of the aerobic or facultative anaerobic kind and also the strict anaerobes. The first include staphylococci, streptococci, bacillus pyocyaneus and the members of the colon group and to the second belong tetanus

bacillus, bacillus of malignant edema, the bacillus aerogenes capsulatus of Welch and the indeterminate series to which gas gangrene is attributed.

The exact rôle played by the colon group has not been determined. The action of staphylococci, streptococci and other pyogenic organisms is well known. In their range in the tissue they contribute indirectly to the greater consequences of the action of certain anaerobes which have been earned in the production of gas gangrene. The aerobes have brought about trigonism on quinine in the present war and the effort to represent this condition have been directed against them more equally. The presence of pus is no longer being compared to the clinical evidences of tetanus, malignant edema or gas gangrene.

The purification of these resistant organisms is the merit of the surgeon. There is to the sterilization of instruments and all material used in the treatment of the wound proper. The spores of malignant edema resist a temperature of 100°C for a half hour. Those of bacillus perfringens require 3 minutes boiling. The spores of tetanus in dry soil and discharge remain virulent for many months and in this condition will become resistant so that autoclaving is really the only effective way of killing them. In addition to their resistance to sterilization the anaerobes elaborate toxins locally which do not enter the blood stream until late. This fact is of value to the surgeon and the radical methods of wound treatment employed in all infected wounds at present are yielding excellent results.

Tetanus bacillus is the most important of the malignant anaerobes. The toxin is produced locally in the wound and is carried along the peripheral nerves to the central nervous system especially to the cells of the medulla and pons, attaching itself first to the anterior cornual cells connected with the motor nerve supply of the wound area so that the first symptom of tetanus is a cramp in the injured limb.

The antitoxin is derived from the serum of horses that have been immunized against the toxin. The neutralizing effects of antitoxin with toxin is a mathematical process, the strength of a given antitoxin being estimated by the amount of it which is required to protect a given weight of animal against a simultaneous injection of a lethal dose of toxin for instance 1 cm. of the Pasteur Institute antitoxin will protect 1,000,000,000 grams of mouse against a lethal dose of tetanus toxin and the therapeutic dose of this preparation is 50 to 100 ccm. The presence of tetanus is first heralded by the characteristic symptoms when it is too late to be effected much with antitoxin. It is much easier to prevent the union of tetanus toxin with nerve-cells than to unlock the combination after it has been made hence the value of a prophylactic dose. One can not go wrong by administering antitoxin at once when the nature of the soil where the wound as incurred is known or the presence of bacteria such as bacillus aerogenes capsulatus or other spore-bearing

bacilli are found in the discharges. These are nearly always in association with bacillus tetanus—the latter is difficult to find in a wound.

If tetanus has developed, the dose may not be fatal, or there may yet be free toxin in the central nervous system which should be counteracted by antitoxin injected in the lumbar sac. A good plan is to give an injection of 0 to 15 ccm. of antitoxin in the lumbar sac and 100 ccm. intravenously in one or two injections as rapidly as possible after the onset of the symptoms. The additional intravenous dose insures a high concentration of antitoxin in the body fluids and a rapid and more intense action on the toxin. The administration of antitoxin must be supplemented by thorough eradication of the infected focus, since it is useless to administer antitoxin if tetanus bacilli are left in the wound.

The bacillus of malignant oedema is at times found in wounds, under suitable conditions. There is intense serous exudation in the muscles and subcutaneous tissues, the mechanical pressure of which, with the rapid development of the bacilli, cause obstruction of the vessels and resulting gangrene. It is possible to prepare an antitoxin against malignant oedema, but it has never been used therapeutically.

Bacillus *erogenes capsulatus* (Welch) or as it is sometimes called, bacillus *perfringens* is frequently found in the wounds of this war in association with the bacillus tetanus. It causes free exudation of serum with abundant gas production. The resulting emphysema spreads rapidly stripping up the cellular tissue and permeating muscles. The mechanical pressure of the distention and gas obstructs the circulation, with resulting gangrene.

While bacillus *erogenes capsulatus* is the chief agent in the causation of gas gangrene examination of wounds will at times reveal other gas-producing microbes. The latter are prone to appear in wounds where death has resulted from profound tetanus. Pure infections of bacillus *erogenes capsulatus* are not fatal as a rule. These additional organisms are of the anaerobic kind, they produce soluble toxins which are powerful depressants to the heart—the feature of the case being loss of consciousness and an imperceptible pulse.

The shattering effects of a shell-wound or the explosive effects of a wound from the military rifle at close range in the thigh for instance, is a good example of the ideal conditions for anaerobic infection. The projectile carries soil contamination covering skin or clothes deeply into the tissues, shattering the bone, the fragments of which act as secondary projectiles, carry infection into pockets in different directions. The hematoma, contusion laceration, and devitalized tissues provide for the growth of bacteria ideal conditions in a number of foci which are closed by prolapsed muscle and other tissues, and thereby rendered inaccessible to the air. The difficulty of removing the bacteria from such a wound and of preventing them from obtaining a foothold and elaborating their toxins must be obvious.

The bacteria can be removed from such a wound only by free drainage with frequent washing with antiseptics. The advantage of the flow of lymph promoted by such agents as hypertonic saline and eusol (hypochlorous acid) has been well demonstrated in this war. The use of eusol is particularly favored since it adds to its lymph lavage properties, that of being acid which is in itself inimical to the production of toxins. It also opposes the absorption of toxins by the flow of lymph which it induces and by relieving the local tissues of exudate it prevents the mechanical pressure on the vascular supply which is a contributing factor in preventing gangrene.

The use of vaccines against anaerobic infection is not attended with success. The patient is quickly overwhelmed by the toxins, long before the vaccines can have any effect. The role of vaccines lies more in building up resistance against pyrogenic organisms, such as staphylococci and streptococci, in cases of long continued suppuration and fever.

The general condition of the wounded is dealt with largely from the standpoint of shock and in this especially the author is partial to the teachings of Crile who believes that shock is a condition of exhaustion and low blood pressure which may be caused by pain, hemorrhage, sepsis, worry and fear. He has shown that painful stimuli can reach the brain even in a state of general anesthesia, causing exhaustion of the brain-cells. In consequence of brain-cell exhaustion, there is derangement of vasomotor mechanism and lowered blood pressure.

To prevent shock he prevents painful stimuli from reaching the brain-cells. Painful stimuli may reach brain-cells during general anesthesia but they may be blocked by means of local anesthesia. Crile has elaborated many methods of anesthetic association, as it is called, all being attempts to guard the brain-cell from exhaustion by blocking the various paths of painful stimuli.

Aside from local anesthesia the administration of morphine before operation is employed. This lowers the receptivity of the nerve-cell. Morphine is a sheet anchor in preventing shock given in 4-gr. doses with 1/50 gr. of scopolamine which may be repeated if the patient shows by training or rapid breathing that painful stimuli are still reaching his brain.

The next measure employed to prevent shock is to maintain the blood-pressure. This may be accomplished by pneumatic contractions not suitable in war. Bandaging of the extremities is beneficial in falling circulation in the presence of shock.

The pressure may be maintained by transfusing blood (Crile) which is better than saline solution, which exudes from the vessels and may accumulate in loose tissues about the abdomen in sufficient quantities to embarrass respiration.

Adrenalin may be added to the solution to be transfused and pituitary extract in appropriate doses has been used. Crile says that atropine stimulates the brain-cells and acts harmfully alcohol is

not much better. Camphor and caffeine are used by some.

At the first aid station the hemorrhage should first be arrested, the gross soiling of the wound removed, first aid dressing applied, morphine given to relieve pain and fixation applied wherever possible. The use of alcohol and strychnia should be avoided but the patient should be given hot tea or caffeine. Fluids should be given to sustain blood pressure.

At the clearing hospital all serious wounds are re-dressed under an anæsthetic. Patient with compound fractures are in-sed to favor free drainage and care should be taken to apply a well fitting splint that will not cause pain. When deemed necessary or advisable it is well to use some form of regional anæsthesia. This may be practised upon those who have been operated on or in severe fractures to avoid shock. The addition of potassium sulphate to the local anæsthesia solution will lengthen its effect. Morphine in transport is employed to ward off pain and shock. Its use protects the brain cells from continued painful stimulation. Saline infusion with the addition of adrenalin is useful in shock after hemorrhage otherwise pituitary extract should be used.

At the base hospitals patients are examined as to their general condition, the temperature and the pulse rate. If they are comfortable they should be allowed a period of rest unless there is evidence of gas-gangrene. Compound fractures are X-rayed and when necessary to remove the dressing and splints these should be reappplied under anæsthesia.

Extensive lacerated wounds without fracture should be put at once into a saline bath with the addition of eusol when the discharges are very offensive. This is good for sepsis and it avoids pain. It helps frequent redressing.

Shock is prevented by warding off the conditions that cause it: pain, sepsis and hemorrhage.

Pain is relieved by proper dressing, proper fixation, and the use of morphine. Sepsis is avoided by ample drainage.

When shock is caused by loss of blood saline solution should be administered at a temperature of 71.2 F with 10 to 20 drops of adrenalin to the pint into the rectum, cellular tissues or a vein if the symptoms are urgent.

Before operation morphine given with atropine should be administered hypodermatically. If the patient is to undergo any severe operation, local and regional anæsthesia should be employed. For this purpose one may use infiltration with novocaine per cent with adrenalin chloride added. If to this is added potassium sulphate gr 10 to each ounce the anæsthetic effect is prolonged and pain after operation is lessened. The use of urea and quinine is sometimes employed by Crile for the same purpose in lieu of potassium sulphate. Instead of infiltration around the main nerve supply infiltration in the cauda equina may be employed for the benefit of cases of operation on the lower extremities. In

filtration of the tissues should be done with a large syringe so that force may be exerted to distend all the lacerations and this may be facilitated by making an incision with the hand.

Cutting with a sharp knife causes less shock than tearing with an ill manipulation should be gentle. Oxygen may be used in the flap and the patient's head held below.

After operation the usual methods to maintain blood pressure with renthol of the patient should be resorted to.

In early first aid treatment is the application of the first aid dressing, namely, a sterile gauze pad held in place by a bandage. It may have been applied by a regimental surgeon but is often by a stretcher bearer or a patient's comrades. This dressing has been found to prevent further infection of the wound in the field.

While in the field first aid men use the gauze bandage, but in the hospital the use of a powder gauze or solution. The gauze will penetrate and act at a distance. The powder and solution are harmless to the tissues and do not become putrid against bacteria and the pores. The effect of this antiseptic is purely local and hence no danger to be apprehended from absorption. It promotes lymphatic drainage and controls infection. The powder can be introduced in the first aid dressing. When water is available it can be made into a solution for general use. The constituents of the powder are inexpensive and easily procured and its preparation is very simple.

The removal of the first aid dressing is done at the field ambulance at the earliest moment practicable the earlier the better. In superficial wounds the dressing is removed by the surgeon who wears rubber gloves the part are cleansed with ether and then laid on a clean towel. The surrounding surface and wound are painted with a 5-per-cent solution of iodine and the wound is then dressed with iodoform gauze.

A wet dressing is used in more extensive foul wounds and a large drainage tube should be placed in the depth of the wound. Deep wounds may require drainage by counteropenings and the use of immobilization is always in order for fractures and extensive wounds.

The application of dilute antiseptics to a wound will only reach the organisms that are disposed on the surface. In order to reach deep infections one has to practice thorough drainage and wash out the remote recesses with weak antiseptic solutions such as a 1-per-cent tincture of iodine, 1-per-cent carbolic acid, 1-1000 mercuric iodine or 1-1000 mercuric chloride in dilute form.

Ample drainage with the application of hydrochloric acid in the form of eupad or repeated irrigations with eusol has proven one of the most efficacious agents in the penetration of anaerobic infection in the present war.

Eupad is a powder consisting of equal weights of bleaching powder and powdered boron acid in

dy mixed. Wounds which are packed with e impregnated with the powder are stimulated the escape of hydrochloric acid gas, which is a rful antiseptic. Congestion and oedema are cured. After a few applications th antiseptic moved and hypertonic salt solution is subtit-

col is prepared by shaking up 5 gm. f eupad oe liter of water, after standing for a few hours solution is then filtered through cloth or filter

other way of p eparing the solution is as fol- To one liter of water add 2.5 gm. of boric powder and shake again allow t stand for time, preferably over night, then filter off and clear solution is ready for use.

ne method of using the two forms of hypotonic acid in accordance with present experience follows

Eusol which is a standard strength of approximately 0.5 per cent hypochlorous acid, may be used as a solution diluted with water or normal salt, as a fomentation covered with a water proof ring (c) on gauze without a water proof cover (d) as a bath, full strength y diluted.

Eupad is used when it is desired to apply a concentrated antiseptic as follows. The wound cked with gauze with the powder between the s when the fabric is dampened with w ter dressing is then covered with wool and band-applied as above and covered with a water-proof ring f r only ot 20 min ten as rule. When occurs a weaker application should be employed rands of gauze or wool impregnated with the ter and used as drainage or as a dusting powder plet sores.

ie general principle of the antiseptic applica is to secure maximum antiseptic effect th num amount of irritation. To this end the so- may be increased or diminished in strength o the local effects of the powder this is t be ated by the additional amount of the powder may be dusted on the wet gauze.

perience shows that 0.5 per cent eusol is pt itate the skin or tissues, but the irritation s of duration because it is warded off by contact albuminous substances. To obtain contin- antiseptic ction the wound should be washed rth eusol solution 0.5 per cent in every cavity o inju ed part. Perforated rubber tubes 6 mm- ameter covered with bath toweling are led to r pocket of th wound. In case of compound ure, the tubes are carried to the area of ure and thei ends lie among the fragments. wound is then filled with gauze covered with absorbent cotton through which the tubes pro-

Either continuous irrigation is employed ol solution is run into the tubes every hour the more successful cases the wound will be aseptic in from 3 t 5 days eod the edges can be brought together with strips of plaster c compound fractures treated by this method

become clean and can be made to heal like aseptic fractures.

The principle element of treatment of large septic wounds is the establishment of adequate drainage and the removal of foreign bodies and dead tissue. The latter may be removed by cutting away with scissors or by curetting. The whole wound may be excised with advantage in some cases.

Wound drainage an important factor in the treat ment of wounds is practiced more satisfactorily at the base hospitals. The drainage should be provided with all necessary counteropenings. Rubber drainage tubes are preferable to gauze drains, which are apt t clog. Loose woven cotton bandage is better than gauze. One end of the bandage is placed in the wound and the other is carried in a bowl containing a little saline solution. Th wound is kept wet either by an irrigation drip or by fre quently pouring saline int the wound, and when dependent counteropen g has been made split rubber drainage t be is passed through the wound and the bandage is mad to slip along side of this tube

Irrigation of wounds assures a more steady meth od of f eeing the wound of toxic matter and to this end the osmotic action of hypertonic solutions is taken advantage of. The flow f saline in and out of the wound continuously removes the film of toxic matt and the aby limits t ne absorption. The wounds found most suitable f r treatment by con tinous irrigation are impound fractures and deep septic wounds, especially of the ppe arm and thigh. Fomentati as of bot bon acid may be alternated at times with the oth methods of treatment espec ally when the w u ds become at glish in healing

The bath treatm nt of wou ds induces healing by increasing the blood supply to th part. Regions like the face rich in blood supply heal faster than other part ilk the feet for instance. Hypertonic solution has t great extent replaced the antiseptic bath and it is deafo wounds, f the limbs below the elbow and knee. Continued too lo g t renders the tissues sodden and n dring to the patient, nd it is ot p actured with patient in serious condition. The bath may be alternated with fomentations at night or it may be replaced by irrigations in th day.

The open treatment of wounds consists i placing a laye of wet gauze over the wound in lieu of the old gauze wool nd bandage which acts as a septic poult ce

T eatment f M wounds by excision. The treatment of compound fractures cranial and joint ounds has been very much modified by the employ ment of excision. The sooner the excision is made the better because later a large bank of inflamed infected tissue surrounds the wound. In such cases hypertonic solution will render the wound ready for operation in 4 t 48 hours. Co tra-indications to excision are marked pocketing in the wound and the exposure of vascular or nerve-trunks or of bone, hich it is inadvisable t remove. In any case excision f the eiled edges f the kin superficial tissue and

Hospital at Constantinople during which time they made 222 surgical interventions.

Among the 222 operations were 9 amputations 4 of the upper arm, of the thigh 4 of the lower leg; 16 resections, 5 of the knee-joint, 6 of the ankle joint, 3 of the shoulder joint, 1 of the elbow, 1 of the wrist, 3 exarticulations, of the phalanges of the thumb 2 of the shoulder joint, 11 cranial trepanations, 4 vascular operations (ligature of the brachial) for periphrastic septic hemorrhages, 2 previous to exarticulation operations, 2 resections of ribs, 5 laparotomies (3 of these cytotomies) enucleations of the eye.

The other cases included incisions, curettings, sequestrotomies, luxations, reductions etc. There were also some epididymectomies, and testicle resections for infections. The operative mortality was 11.25 per cent, 5 deaths. In the 9 amputations 8 died, 4 2 per cent—2 upper arms, 3 thigh, 3 lower leg. Of the 16 resections, 8 died, 11.75 per cent—of the knee-joint, of the shoulder. Of the laparotomies, 8 died, 80 per cent. Of the trepanations, 3 died, 7 per cent. The other 11 deaths were in typical operations and are not specially enumerated.

There were 6 cases of gaseous gangrene, 4 of cerebral abscess, 6 suppurating fractures, case of projectile extracted from the bladder. As general rule all these wounded arrive in the hospital in a more or less infected condition. Of the cases of gaseous gangrene 3 occurred in amputations, 1 with amyloid degeneration for empyema. In one case it was necessary to amputate 3 days after a resection. The authors think that in cases of doubt between resection and amputation, as the organic resistance is very low it is better to resort to amputation at first because it is better to lose a limb than a man.

W. A. BREWSTER

Leriche, R. *Integral Operative Statistics of Surgical Service at the Rear* (Statistiques opératoires intégrales d'un service de chirurgie de l'arrière). *Lyon chir.* 9 6, xlii, 193.

In the two rear hospitals of which Leriche had charge 99 wounded were received between September 10th, and October 15th, 915. All those received and operated upon within twenty-four hours of injury recovered. The others were mostly received from two to five days from the line of injury and of these 7 died.

All the wounded had received antitetanic serum at the front. All later received a second injection and even a third where there was a late intervention. No case of tetanus developed.

There was only one case of gaseous gangrene. This was in a man who had lain five days on the field. He was cured.

Of 88 cases which the author considers definitely cured 133 have recovered their physical strength almost completely, 55 have a physical value more or less diminished—loss of a limb, eye, etc.

W. A. BREWSTER

Cutler F. J. *The Surgical Disabilities of Troops in Training*. *Preadmirer* Lond. 9 6 xvi 359.

A large number of mutilating gunshot wounds of the face have occurred during the present war. Many of these have been complicated by fracture of the mandible. The usual method of treatment is by wire splints fastening the teeth in position. So many of these cases however result in loss of bone either from immediate destruction or from subsequent infection, that it is often necessary to fill in a considerable gap in the mandible. This is best accomplished by transplantation of bone. The wounds must have soundly healed and all septic or damaged teeth removed from the neighborhood of the fracture some time previously. A portion of a rib is then accurately fitted into the gap fastening it there either by wire tacks or by silver wire.

It would seem that this transplant acts mainly as a scaffold for the new bone forming cells, but a case reported by Albee would indicate that the transplants themselves have power of bone degeneration.

J. H. SMITH

Latarjet, A. *The Working of Clearing Ambulances* (Le fonctionnement d'une ambulance). *L. chir.* 9 6 cli 166.

The author gives very interesting particulars of the surgical work done in a field ambulance during the period of offensive. To this ambulance service was assigned the work of receiving all the wounded from an army corps. During the 5 days of attack, 9,358 wounded were disposed of. Of these 5,012 were slightly wounded, and 4,346 had more or less grave wounds.

Of the 5,012 slightly wounded, 4,666 were immediately dispatched to the clearing hospital. The remaining 4,355 were examined and had their wounds dressed. These wounds comprised

Head and neck	73
Thorax	354
Abdomen	102
Upper limbs	1600
Lower limbs	1310
Multiple wounds	46
Shock	91

After the wounds were dressed these men were sent on to the clearing hospitals at the base. The 4,317 injuries of the seriously wounded were as follows:

Head	56
Neck	96
Thorax	531
Abdomen	267
Upper limb	816
Lower limb	1443
Spine	18
Genital organs	24
Multiple wounds	365
Gas intoxication etc	41

Of these 4,317 308 died during the period within five days, mostly a few hours after arrival and with-

out intervention. Sixty three died while being conveyed from the field to the ambulance. The total immediate mortality was 254.

Of the 531 thoracic wounds 176 were shell wounds, 132 bullet and 9 bomb wounds. Twenty three died between the first and third day from hemorrhage or shock. 16 died from the fourth to twelfth day. Of the 26, abdominal wounds 124 were penetrating. Two hundred and fifty four of the wounded intransportable and inoperable were hospitalized on the spot. The others were dispatched to the clearing base hospitals, either by auto or train.

Hospitalization within a few hours of injury immediate large evacuation of wounds and evacuation only toward the interior when the patients are in a fair way to recover are the ends to be sought if lamentable consequences are to be avoided.

W. A. BRENNAN

SURGICAL PATHOLOGY

Bristol L. D.: Free Tumor Diagnosis as a Function of State Public Health Laboratories. *J. Am. Med. Ass.* 19 6 1vi, 678

The results of investigation show that for pathological examinations in state laboratories of the 48 states 24 have facilities for the diagnosis of suspected cancerous tissue either in their state public health laboratory or in some other state institution while 24 do not attempt such work.

Of the 24 states which have facilities for making tumor diagnoses 5 charge specified fees 6 charge all persons except indigents and 13 make no charge in any case.

From information available it seems that opinions of authorities differ somewhat as to whether or not tumor diagnoses should be made free of charge either by state public health laboratories or other institutions as an important aid in the campaign against cancer.

The chief arguments received against the free diagnosis of tumor tissue in state laboratories are as follows:

1. Diagnosis of tissue for cancer is merely a private consultation and is not regarded as public health work.
2. The plan would savor too much of state medicine.
3. As a rule the appropriation for the state laboratory does not warrant the doing of more work and tumor diagnosis should not interfere with the diagnosis of the so-called communicable diseases.
4. There is danger of spreading cancer-cells into other parts of the body by the excision of small specimens for diagnosis.

The following recommendations are submitted as worthy of consideration in the campaign against cancer.

1. So far as consistent with local conditions facilities should be offered under public auspices in each state for the diagnosis of tissue suspected

of being cancerous. Preferably these should be made free of charge.

2. The logical place for doing such work is the laboratory of the state health department. It is not to be supposed that such work will be given preference over other work now being done by these laboratories.

3. To cover this work in those states which have no such facilities additional money should be appropriated.

4. Judgment must always be used by surgeons in the removal of suspected cancerous tissue for diagnosis and the value of a microscopic diagnosis should appear to outweigh the risk involved before such a procedure is adopted.

EDWARD L. CORWELL

Birch F. W.: A Group Study Plan for a Diagnostic Team Acting as a Laboratory for the Profession. *J. Am. Med. Ass.* 19 6 1 i 67

St. Luke's Hospital, San Francisco is the only institution reported to have organized specialists to act as a laboratory for diagnostic purposes returning the patient after investigation to the referring physician with a protocol of the findings and recommendations for the treatment of the case.

This new era in medicine is very young; the medical universities are not yet teaching this type of medicine; they have not even accepted it and in fact there is no definite instruction to be had on the subject. The method of group study now employed in hospitals by referring the patient from one department to another without joint discussion of cases by the heads of these departments is open to as severe criticism as that which Doctor Cabot applied to the methods of the general practitioners.

It has not been long realized that the three great classes of patients, the rich, the poor and the middle class are receiving quite different medical attention. The rich man while he is able to pay for the services of a large number of high priced specialists presumably gets the best medical consideration but unfortunately the highly paid specialists are individuals who are not organized and their work is not correlated; consequently consultations are often perfunctory and unsatisfactory to both physician and patient.

The diagnostic section of St. Luke's Hospital, San Francisco consists of ten men, each having special training along some particular line. The members of the profession refer obscure cases to this section for diagnosis. These patients are placed in the hospital for observation and each member of the diagnostic team makes an individual examination and a written report of his findings. At noon each day the team meets to discuss the cases. If the case is not clear at the first consultation further investigation is recommended and any new discoveries are reported the following day. This method of procedure is continued day after day until some conclusion is reached. The physician

who referred the case is asked to be present at all of these consultations. Finally the patient is referred back and a written report of the findings and recommendations for treatment are mailed to the attending physician. Thus the specialists make of themselves a diagnostic laboratory.

All of this work is being done by the diagnostic team for a fee commensurate with the patient's income. The amount collected is not sufficient to pay for the time of the clinicians. However the good that is being accomplished by this method of study and the educational returns for each member of the team in daily discussion with his colleagues amply repays the clinicians.

The success of a plan of this kind depends, briefly on the following conditions. The diagnostic team must accept from the professional case for investigation at a price consistent with the income of the patient. Cases should be examined by all the members of the team, the results of their findings must be written, the specialists meet in daily consultation over the cases, and investigations continue until all possible evidence is discovered. The case is returned to the physician who sent it and a report is mailed, together with the conclusions and suggestions for treatment.

The results to be expected from such a scheme are these. The general practitioner will gladly accept it, the good influence of the family physician will be preserved, medical men in the community will take advantage of the daily discussions and gradually broaden their point of view of medicine, this method of group study will maintain the advantages of specialization and do away with the disadvantages. Clinical reports from this work bearing on these predictions are now being prepared for publication.

EDWARD L. CORRELL.

Binnis, J. F. The Role of the Sympathetic System in the Diagnosis of Abdominal Diseases. *Am. J. M. Sc.* 9 6, 631.

The phenomenon of pain or tenderness in acute abdominal diseases occurring in a situation different from the diseased organ, for example, the median line pain in early appendicitis — commonly spoken of as reflex pain — is explained by the author on the basis of development and physiology of the sympathetic nerve supply of the region.

Reviewing the embryology of the abdominal viscera, he points out the median position of organs (and therefore of the nerves supplying them) which later migrate to lateral positions, but their nerve supply maintains the original median connections. The anatomy of the abdominal and thoracic sympathetic system is reviewed in detail and its connections with spinal nerves, pneumogastric, phrenic, etc. are recalled. Periumbilical pain in the peritonitis is explained through the distribution of the right phrenic nerve which sends fibers to the diaphragm, liver and anterior parietal peritoneum as low as the umbilicus. The connections of the right phrenic with the lower intercostal

nerves, through the diaphragmatic plexus, explain right-sided abdominal pain in thoracic diseases, e.g. empyema or pneumonia.

Referred pain is due to the increased number of afferent impulses from an irritated organ coming to the nerve-center which is unable to handle them in the normal way and the result is a radiation of the afferent impulses along the trunks of the sensory nerves, passing near the center giving rise to a sensation of pain at the nerve-endings. If a motor path is affected the result will be muscular rigidity.

The phenomenon of crossed pain tenderness of the superficial sensory nerves, difference in protopathic and epipathic sensibility in abdominal inflammations with the resulting clinical signs, are described in detail.

The author discusses the more recent work by neurologists on the causes and nature of abdominal pain due to irritation, distention, etc., and explains the origin of secondary pain or that arising through extension of the irritation beyond the organ first affected.

That renal pain is not midline is due to the lateral development of the kidney. Renal irritation as in ascites, therefore does not give rise to epigastric pain. The occurrence of atonic contraction of the anal sphincter due to renal irritation and causing symptoms of intestinal obstruction is explained also the role of the sympathetic system and the phenomenon of radiation in genito-urinary organs, especially in prostatic disease is elucidated.

HONORÉ BERRY.

Stoddard, J. L., and Cutler, E. C. Torula Infection in Brain. *Monographs of Rockefeller Institute for Med. Research*, 9 6, N 6 Jan., 31.

Two cases from the Cushing's clinic at the Peter Bent Brigham Hospital presented at autopsy unusual lesions in the brain and meninges. The histories and physical examinations included such signs of cerebral tumor as to indicate decompression or exploratory operation, but the pathological examination in each case proved the complete absence of tumor. Lesions were found, however which fully explained the clinical symptoms and physical signs. Enormous numbers of organisms having many points of resemblance to those of blastomycosis occurred in all of the lesions in such a manner as to leave no doubt of their causal relations. Certain differences from the usual descriptions of the organisms of the blastomycosis group and their lesions made a careful study necessary to determine the relations of the authors' cases.

Two problems which have received increasing attention in late years, without great progress toward their solution, were thus brought to the author's notice by the study of the cases. I.e. the problem of cerebral pseudotumor and the problem of the relationships of the lower fungi forming the group called blastomycosis. It seemed probable to the authors that their cases might throw light upon both these questions.

In the study of the first problem that of pseudotumor cerebri, the literature furnished a considerable number of cases in which symptoms and signs of brain tumor existed for a short or long time with subsequent recovery or with indefinite autopsy findings.

In trying to solve the other problem, that of the relationship of the organisms of the blastomycosis group they studied the literature and made animal experiments. In their experiments they used pure cultures of three different organisms one isolated from a human case of cutaneous blastomycosis one from a human case of coccidioidal granuloma and one from Frothingham's case of torula infection in a horse. Inoculations were made in various ways upon several species of laboratory animals and agglutination experiments done upon the infected animals.

One of the problems in the authors' work was the relationship of the organisms causing the diseases termed blastomycoses. They have shown the confusion existing in textbooks where the various diseases are described as one disease or as different manifestations of the action of a single organism in different states. The study of the literature convinced them that coccidioidal granuloma was a disease distinct clinically pathologically and biologically from other diseases called blastomycosis. Having decided that coccidioidal granuloma was a distinct disease, they turned their attention to the blastomycoses. They found in the literature two cases of skin and general infection produced by a true yeast with endospores in culture. Both cases were observed by Buschke and appeared to be distinct from the American cutaneous disease. Frothingham's discovery of torula infection in a horse indicated another type, but no such cases had been reported in human beings.

The authors' cases were distinct from the larger part of the reported cases of blastomycosis in their clinical histories and pathology. It did not seem improbable to them that in the early study of blastomycosis such cases had been described, but their nature not recognized. They studied the original reports of all the cases of systemic blastomycosis and found that nearly all the cases were similar so far as could be ascertained from the printed reports except those involving the brain. Among

these there were obvious differences. First there were six cases like the other systemic cases but in which the brain became involved as part of the general infection which always included skin manifestations and often bone lesions. The symptomatology was not perceptibly influenced by the brain lesions. The pathology of the brain lesions resembled that of the other lesions. Different from these were four cases in which there were no skin lesions but in which a general infection occurred with brain lesions which caused the predominating symptoms. Pathologically the lesions were distinct in many ways but principally in the extension by solution of tissue the always chronic reaction and the production of a gelatinous material in the lesions.

Their first case was evidently identical with this latter group. Their second case was not fully identifiable by the study of the literature alone for the peculiar intracerebral lesions were not present and the parasites occurred in greater numbers of small forms. Such forms occurred in the meninges of the first case but not in the intracerebral lesions and were not described in the literature. In the experimental meningitis in a mouse produced by the injection of a culture of the ventricular fluid from the second case however large organisms were produced identical with those of the first case and intracerebral lesions of the same type were seen in process of formation. Thus their two cases proved to be alike in origin. Frothingham's case of torula infection was evidently the type of infection of these cases. In their animal experiments with torula the authors found both forms of parasites present in the lesions in varying proportions according to the extent and activity of the process. In a very active lesion enormous numbers of small organisms similar to those of the second case occurred these were seen especially in the meningeal lesions. In older lesions tending toward recovery or in those slowly progressing and in the higher animals the larger forms predominated. In sections of the original horse lesions small forms were entirely absent. Their experiments resulted in the production of all the variations in lesions and organisms seen in the cases. The animal experiments thus provided the necessary steps for the clear correlation of all the human cases as cases of torula infection.

GEORGE E. BERLEY

GYNECOLOGY

UTERUS

Stein, A. The X Ray Treatment of Uterine Myomata; a Warning Based on a Study of the Literature. *Med Rec.* 9 6 XXXX 99

Stein sounds a warning to the enthusiast on the X ray treatment of uterine myomata and has thoroughly reviewed the literature of this subject citing numerous instances to substantiate his contention that the X ray does not accomplish all that is claimed for it.

Since according to Klein, 77 per cent. of uterine myomata show malignant degeneration in some form, how is it to be determined whether one is radiating a malignant tumor or a simple myoma? As a matter of fact, the author continues, at the present state of our radiological knowledge we have a perfect right to take for granted that the X rays may set up proliferative changes of a degenerative character in those areas of a radiated myoma which are not destroyed by the treatment. Furthermore, women in the child-bearing age may have their functioning ovaries badly crippled or even destroyed, thus endangering later offspring through changes of the germ plasma produced by extensive radiation. Sterility is common following long exposure to the X rays.

The author calls attention to the difficulty in selecting suitable cases for diathermy and cites a case of interstitial pregnancy with profuse hemorrhage who was given the choice between radiation or operation for myoma of the uterus. Fortunately the patient chose operation. She made an uneventful recovery whereas, otherwise a rupture of her interstitial pregnancy might have meant sudden death.

Injuries directly traceable to the X-ray treatment of intra-abdominal lesions are practically unavoidable. Multiple peritoneal adhesions, deep ulcers of the abdominal skin, sclerotic changes of the pelvic connective tissues, irritative conditions of the bowel and bladder, atrophy of the gastro-intestinal glands are conditions of lesser importance which may result from continued radiation.

In conclusion the author says judiciously restrained the indications for the X ray treatment of uterine myomata are very limited, including besides myoma patients who have reached the climacteric, those suffering in addition from diabetes, obesity, advanced arteriosclerosis or hemophilia, in whom surgical interference involves serious danger to life.

HARVEY B. MATTHEWS.

Crossen, H. S. Choice of Operation in the Various Classes of Cases of Retrodisplacement of the Uterus. *J. Ma. St. M. Ass.* 9 6 XII, 260.

The author has endeavored to make clear the method which should be employed to hold the uterus in anterior position.

A dependable presentation of this subject implies a careful consideration of the various operative measures devised and their adaptability to the correction of the pathologic condition present in different patients. There is considerable confusion at the present time and for the very good reason that there are certain factors in uterine support not yet fully understood even in physiologic conditions and much less in pathologic conditions.

The following according to the author may be taken as a safe working basis:

1. Most of the symptoms in retrodisplacement of the uterus are due to complicating conditions. Therefore such conditions must be treated first and the treatment of the retrodisplacement will depend to a large extent upon the complications.

Normally the uterus is held in position by a combination of structures. Therefore, in any scheme of restoration, either this combination support must be restored or other structures utilized to bring about a similar support.

2. Pelvic floor support is absolutely necessary to the permanent correction of any retrodisplacement.

3. When decided prolapse of the uterus can be excluded the problem, after treatment of the complications, resolves itself into maintaining the corpus uteri in the anterior position and the cervix in the posterior position of the pelvis, with sufficient elevation of the uterus and adnexa to prevent dragging on hypersensitive attachments.

4. As this problem varies with the different pathological conditions present, it is advisable for purposes of study and comparison to group the cases into classes somewhat as follows:

A. Future pregnancy possible.

- (1) Adnexa intact—tissues freely movable.
- (2) Ovary and tube of one side removed.
- (3) Tube only removed.
- (4) Ovary only removed.
- (5) Diffuse tissue infiltration, fixing ligaments.
- (6) Varicose veins of the broad ligaments.
- (7) Cervix too far back.

B. Pregnancy not possible.

- (1) Active uterus preserved.
- (2) Scirrhous uterus preserved.

6. For maintaining the corpus uteri in the anterior position there are a number of fairly satisfactory intra-abdominal methods which utilize one or more of the ligaments supporting the uterus.

7. In general, it may be stated that vaginal operations for retrodisplacement is indicated in those cases where other deep vaginal work is needed and lesions requiring abdominal section can be eliminated.

HARVEY B. MATTHEWS.

ADNEAL AND PERIUTERINE CONDITIONS

Heineberg, A.: Tubal Sterilization Pregnancy Following Bilateral Salpingectomy: A Report of Two Cases and a Complete Review of the Literature. *V F M J* 1916 cll 107

The author reports two cases of pregnancy following bilateral salpingectomy where the tubal stumps were merely ligated. With this report he presents a careful review of the subject in its surgical phase discussing the various surgical procedures that have been developed.

He offers the following conclusions:

1. There is no method of tubal sterilization which affords absolute security against conception.
2. Simple ligation of the fallopian tubes with either single or double ligatures has been followed by the largest number of reported failures.

3. Excision of a wedge-shaped section from each cornu of the uterus, followed by careful closure of the opening with musculomuscular and seroserosus sutures has yielded better results than any other method.

4. In the light of our present knowledge it seems unwise to advocate any other method than cornual resection. The conclusions are in accord with those arrived at in previous reviews of this subject.

CAROL CULBERTSON

Long, J. W.: Shivering the Round Ligaments. *Is S'g Phila.* 1916 lill 690

To the multitude of operations already devised for the correction of backward displacement of the uterus the author adds another for which he claims simplicity and efficiency. It consists in grasping the round ligament near its middle with a forceps and making traction upon the distal portion. While this tension is held a round needle armed with linen or silk, is thrust through the ligament close to the pelvic brim just as it leaves the inguinal canal. The needle is then put through the ligament by an over-and-over stitch about every quarter of an inch until a sufficient amount of the ligature to insure a proper degree of shortening has been included. The last puncture of the needle usually passing through that portion which has been transected by the forceps. By pulling the two ends of the ligature together the ligament is shirred and the necessary shortening produced. In addition to this the author has found that traction on the suture develops a small *mesoligament* which springs from the pelvic wall. This piece of peritoneum may be well utilized to cover over the shirred portion of the ligament. The same suture may be used for the entire operation.

GATEWOOD

EXTERNAL GENITALIA

Gittings, J. C., Hamill, S. M., and others: A Report of the Committee on Vaginitis. *A Ck Pediat* 916 xxiii, 351

This committee appointed to investigate the subject of vaginitis in infants and young girls

conducted a very thorough investigation. A questionnaire was sent to various institutions caring for female children and to a large number of pediatricians. With these replies as a basis they formulated the following set of resolutions:

1. That cities be required to provide adequate hospital and dispensary facilities for the care and treatment of children having vaginitis.

2. That matrons be placed in charge of the girls toilet rooms in public schools.

3. That toilet seats embodying the principle of the U shape be used in all schools and that the toilets be of proper height for different ages.

4. That city and state laboratories be empowered and equipped to make bacteriologic examinations for physicians when patients cannot afford to pay a private laboratory fee.

5. That educational literature on the subject of vaginitis be prepared and distributed to mothers through the medium of physicians, hospitals, dispensaries, health centers, municipal and visiting nurses.

6. That asylums for children and day nurseries be licensed and that the license be not granted unless first the institution has adequate facilities for the recognition of gonococcus vaginitis and second that the institution exclude children having this disease if they cannot be properly isolated.

7. That separate wards be maintained in hospitals for the treatment of children with vaginitis who are also suffering from other diseases.

8. That microscopic examinations of smears be made before admission to the general wards of the hospital. In securing material for the smears extreme care should be taken to observe rigid aseptic precautions.

9. That observation wards be provided.

10. That individual syringes, bed pans, catheters, clinical thermometers, thermometer lubricant, wash basins, soap powder, wash cloths and towels be provided.

11. That single service diapers be used (at least for girls) or that diapers be sterilized in an autoclave at 15 pounds pressure for five minutes.

12. That nurses be required to make daily inspection of the vulva of each at the time of bathing and to report immediately the presence of the slightest suggestion of a vaginal discharge.

13. That low toilets be provided and equipped with seats embodying the principle of the U shape.

14. That for routine purposes, the spray be used in place of tub-baths for the bathing of young girls and that older girls be sponged in bed.

15. That nurses receive special instruction as to the nature of vaginitis, the ease with which it is transmitted, the methods of preventing its spread and the necessity for rigid aseptic surgical technique in its handling and treatment.

16. That a dispensary with special facilities for the treatment of gonococcus vaginitis be provided.

17. That nursing care and supervision be given in the home.

18. That mothers be instructed as to the dangers of vaginitis, the manner in which it is transmitted, the best method of protecting other children, and the necessity of prolonged observation.

19. That all cases of vaginitis under observation be voluntarily reported to the local health officer in states or cities where no legal requirement are in force.

EDWARD L. CORRELL.

MISCELLANEOUS

Watkins, T. J. *Diagnosis in Gynecology*. Chicago. *McGraw-Hill*. 9 6, xxviii, 359.

An analysis of abdominal palpation shows that it is always relative, that the findings are estimated by comparing the resistance to pressure over various areas of tissues or organs. By comparison only can a very soft pregnant uterus, a distended bladder or cyst with fluid wall be at times detected by palpation. The palpation should always be light, as firm pressure lessens the tactile sense, causes pain and excites rigidity. Observation of the facial expression is of great value when palpating for tenderness.

The technique of kidney palpation consists of the use of delicate vibratory palpation, such as is employed in bimanual examination of the uterus and ovaries. One hand is placed just below the ribs posteriorly and presses the kidney gently forward with the other hand delicate vibratory counter pressure is made anteriorly over the region of the kidney.

Greater tenderness over the region of the appendix than over the corresponding region on the opposite side is diagnostic of chronic appendicitis, other demonstrable pathology being excluded. Absence of tenderness does not exclude appendicitis, as gross pathologic changes in the appendix are frequently found in the absence of tenderness. Atrophic changes (appendicitis obliterans) (Sen) are accompanied by increased tenderness in about 50 per cent of cases. Palpation over the region of the appendix in all gynecological patients is highly important, as experience has demonstrated that the appendix is diseased in a very large percentage of cases with extensive pelvic pathology.

Valuable information is obtained from vaginal inspection and palpation. Urethrocele is frequently not detected and the method of diagnosis is not generally known. Urethral ocele is essentially a downward and backward displacement of the urethra. Urethrocele is detected by pressing the urethra upward toward the cervix, and the distance it can be so displaced represents the extent of the lesion, as it is normally quite fixed.

The position of the uterus can often be determined by the appearance of the cervix. When the anterior lip of the cervix is much thicker or longer than the posterior the uterus is almost invariably in anterior position. The same rule applies to the posterior lip of the cervix.

Palpation of the uterosacral ligaments for tenderness is important as it often helps determine the degree of pathology of a retroposed uterus.

A most difficult class of gynecological patients to diagnose are those with pelvic pain without well defined pathology. Mistakes are commonly made in such cases, as the pain may be due to pathologic states that cannot be detected on pelvic examination, or the patient may have or complain of pain without the presence of pathology in the pelvic organs. It has been found that the pain from adhesions is chiefly due to traction upon the peritoneum. It is, therefore, easy to appreciate that any examination which will put such adhesions on tension will be attended by pain. This fact can be utilized in the diagnosis of such cases.

The low mortality of abdominal section tempts the surgeon to operate for pelvic symptoms without making a careful diagnosis, and for pelvic symptoms without demonstrable pathology. Surgery has developed beyond the time when the results of operations should be based upon mortality. The real test of modern efficient surgery is morbidity.

The considerable danger of occasionally mistaking a large corpus luteum for a small ovarian cyst and of thus subjecting the patient to an unnecessary operation. The corpus luteum at times attains a size two or three inches in diameter due to hemorrhage or edema about the gland. On careful palpation it is impossible to distinguish it from a small ovarian neoplasm. The diagnosis should be made by constantly keeping in mind the possibility of a large corpus luteum in the diagnosis of all ovarian tumors and keeping them under observation a sufficient length of time to allow absorption in case of corpus luteum. A lapse of one month is probably long enough to establish a differential diagnosis.

EDWARD L. CORRELL.

Bello, A. *Menstrual Fistula of the Abdomen* (Fistula menstrual del abdomen). *Rev. Assoc. Med. Argent.* 9 6, xii, 4.

The case reported by the author occurred in a woman of 36 showing symptoms of tertiary syphilis. The uterus was anteflexed with both annexes enlarged and the uterus between them inflamed and painful and showing a prominence in the left iliac fossa without any modification of the skin. Exploration of the fossa disclosed nothing of importance. The wound did not close but established itself as a cutaneous fistula through which there was an abundant flow of blood during the periods and a flow of pus in the intermenstrual epochs.

The fistula persisted in spite of all attempts at treatment, and laparotomy was done. The epiploon and intestinal loops were adherent to the left uterus and annex. The uterus was fibrous and twice the usual size and adherent to the bladder. The right annex was cystic. The tube of the left annex was largely cystic in the ampullary region. The first part of the tube led to a fistula which was located in the abdominal wall at the left of the median line.

A subtotal hysterectomy was done with ablation of both annexes. A portion of the epiploon was

resected and the fistulous tract closed by sutures. Recovery followed. W. L. BRENNAN

Stevens T. G.: Adenomyoma of the Rectovaginal Septum. *Proc Roy Soc Med* 916 1x Obst & Gynec Sect 1

The author refers to cases described by Lockyer, Spencer, Lelich, Bland, Sutton, Gough and Stewart and to his own case previously demonstrated in 1909.

During the preceding eighteen months he has had under his care five more cases. These are tabulated in detail and illustrated. In the fourth of these cases the anterior rectal wall had been so involved as to be drawn up in a double fold without however invading the rectal mucosa. In this case there was also present a cyst of the vaginal wall undoubtedly of Gartnerian origin.

Stevens notes that the symptoms varied. In one case they were menorrhagia and dysmenorrhoea. In two cases sterility was the only complaint. In the other three bleeding was the chief symptom due in one case to fibroids in the body of the uterus in another to chronic metritis and in the last to some unexplained general condition associated with the menopause.

The growths are all situated in the loose connective tissue above the posterior vaginal fornix, bounded anteriorly by the back of the cervix, posteriorly by the rectum, above by the peritoneum. They present hard nodular masses fixed to the back of the cervix and movable with it. They are not tender to the touch and cause no pain. The rectal wall may be involved but the rectal mucosa never.

Microscopically these growths show precisely the same structure as a diffuse adenomyoma of the endometrium but as a rule the gland tubules surrounded by endometrial stroma are few in number. The tubules are often dilated and cystic, not infrequently containing blood or blood pigment. The surrounding stroma is composed of cell elements exactly like the stroma of the endometrium. The fibromuscular part of the tumor is clearly a definite new growth. Although there is no capsule the arrangement of the fibromuscular tissue is such that the growth is quite sharply marked off from the uterine muscle coats. There is perhaps more fibrous and less muscle tissue in the growth than in the uterine wall. In none of the specimens was anything found to suggest an inflammatory lesion.

The author discusses the various theories regarding the origin of these tumors and holds as untenable his original view that they are derived from wolffian remnants. The possibility that they are derived from the muellerian ducts at the place where the fused ducts join the solid mass of cells from which the vagina is developed cannot be disproved.

CAREY CULBERTSON

Montanari E.: The Pathogenesis and Treatment of Genital Prolapse (Sulla patogenesi e sulla cura del prolasso genitale). *Clinica* 96 vii 223

The author passes in review and criticises the various methods in vogue for the treatment of

genital prolapse. He does not believe that vaginal or abdominal hysterectomy can ever be considered an ideal method but only a procedure of necessity inasmuch as such operations produce a grave and irreparable mutilation hence the method should not be used on a young woman with a normal uterus.

Treatments limited to the vagina, such as colpoperineorrhaphy and similar operations are insufficient and interfere with coitus while they do not obviate the anatomopathologic alterations which were the principal cause of the genital prolapse.

The author insists that genital prolapse is chiefly due to inequality between the resistance of the peritoneum and endo-abdominal pressure such inequality being determined either by a congenital or an acquired weakening of the support and stability of the uterus and especially of the soft framework forming the pelvic floor. As a surgical procedure the author considers the operation devised by Ruggi to be the most efficacious and rational for the treatment of total prolapse in women within the active period of sexual life.

The main points in Ruggi's operation are as follows:

1. A circular incision above the normal position of the fornices two incisions perpendicular to this on the two sides of the anterior vaginal column these incisions being turned off at the ends. Three flaps of mucosa are thus formed the central from the anterior vaginal column and two quadrilateral side pieces. The neck of the uterus is drawn out and isolated. The two lower thirds of the lateral walls of the uterus are sutured with catgut to the base of the broad ligaments.

2. Obliteration of the uterovesical and uterorectal cavities suturing the uterine fundus with fine catgut to the peritoneal sac which covers the posterior face of the bladder replacing the uterus. Douglas's sac is sutured to the uterine fundus posteriorly. supravaginal amputation of the neck of the uterus.

3. Posteriorly the sectioned vaginal mucosa is sutured to the posterior half of the stump of the neck in such a manner that a perfect adaptation is made between the vaginal and uterine mucosae.

In front the vaginal column previously isolated is deprived of its superficial mucosa and shortened at its free extremity so that there remains only a strip of solid submucous tissue which is sutured to the anterior edge of the sectioned neck. This submucous strip is then covered by the two quadrilateral flaps previously mentioned. The operation is completed by Lawson-Tait's colpoperineorrhaphy.

The advantages claimed for this operation are:

1. Consolidation of the musculo-aponeurotic ring which includes within it the isthmus of the uterus, and high fixation of the uterus in approximately its normal position.

2. Abolition of pathologic peritoneal formations constituted by the uterovesical and uterorectal sacs.

3. Reduction of the weight and volume of the uterus by amputation of the neck.

4. Narrowing of the lumen of the vaginal canal and of the vulvar orifice: cure of cystocele and rectocele and consolidation of the perineal floor.

5. Preservation of the integrity of sexual function.

The author reports eight cases very successfully treated according to this method and in at least one case it was followed by normal pregnancy and parturition.

W. A. BRIDGES

Hussey A. A. Operating During the Puerperium for Cure of Old Lacerations of the Cervix and Perineum. *Am J Obst Gyn* 1916 **xxix** 14.

The author reports 4 cases in which Stuart and himself had operated for cure of old lacerations of the cervix and perineum during the puerperium. He does not contend that this time of operating is more favorable than other times but thinks that for some of the poor patients in the maternity wards there may be some real gain by operating at this time, since so many of these patients will not return to the hospital even though they are more or less invalidated because of their lacerations.

In 29 of the cases operated upon the recent labor had been conducted under normal conditions in the delivery room. In two cases labor began outside the hospital and terminated in the receiving ward without preparation for delivery. One case was admitted with a transverse presentation with prolapse of the cord and arm after unsuccessful attempts at version by the family physician. Placenta previa complicated two cases. In two cases labor was induced with a bougie. Labor was terminated twice with podalic version and twice by forceps.

The lesions found in these cases were 3 old lacerations, 9 old and new lacerations of the perineum, 5 old lacerations, and 6 old and new lacerations of the cervix.

The cervical lacerations ranged from moderate single to deep multiple. The lacerations of the perineum were incomplete in 38 cases and complete in 2. One case was complicated by a cyst of Bartholin's gland and hemorrhoids.

The time selected for operation was from one to fifteen days post-partum. Five cases were operated upon twenty-four hours after delivery, four cases forty-eight hours after delivery. In 9 cases, the operation was done between the third and seventh days, and in 4 cases between the seventh and fifteenth days post-partum. The post-operative course was entirely normal in 35 of 40 cases and 5 had a little temperature.

In 25 of 29 cases of trachelorrhaphy the cervix is

recorded as healed. Partial union occurred in 3 cases and non-union in one.

Good union was secured in the perineum in 38 cases, and partial union in six cases, non-union is recorded in one case. The condition of the pelvic organs on discharge was normal in 34 cases, while retroversion of the uterus was noted in 6 cases.

The presence of lochia did not seem to have any unfavorable effect upon healing. The post-operative care did not differ from that of cases repaired after recent injuries.

C. H. DAVIS

Healy W. P. Sterility in the Female. *Mtd Rev* 1916, **lxxix** 954.

Sterility in the female may be due to pathological conditions grouped as follows: (1) malformations, (2) inflammations and infections, (3) injuries, and (4) tumors.

Relative sterility cases in the fourth group are due to fibroids of the uterus or in the third group there may be miscarriages as a result of uterine displacements or traumatic lesions of the pelvic organs following previous pregnancies.

The gonococcus is chiefly responsible for sterility due to inflammations. Practically all cases of absolute sterility belong etiologically in the first and second groups. Lack of complete development of the uterus is the most frequent factor in the first group. On this the clinical findings fall into three groups: (1) small poorly developed uterus with scanty menstruation, (2) small uterus with anteversion, a normal period, and dysmenorrhea, (3) a normal sized uterus with long conical cervix, stenosis of the cervical canal, menorrhagia, and dysmenorrhea. Any one of the above groups may be complicated by retroversion. Apparently normal organs in apparently healthy sterile women are found. These cases often have excessively acid vaginal secretion.

Apparently normal cases are benefited by saline douches at bed time and a restriction of intercourse. Groups 1 and 2 should have dilatation, curettage, and stem pessary. Group 3 can be helped by dilatation, curettage, and the Dudley operation on the cervix.

Retroversions should be corrected by pessaries or operation.

Sterility due to gonorrheal infection is least satisfactory to treat. Those cases in which no palpable lesions of the adnexa exist should have dilatation, curettage and saline douches. Failing this an exploratory laparotomy should be done with proper care of any adhesions found.

Gonorrheal cases with palpable lesions require curettage and plastic surgery on tubes.

W. F. HEWITT

OBSTETRICS

PREGNANCY AND ITS COMPLICATIONS

Costa R. Treatment of Extra uterine Pregnancy in the Advanced Periods (La terapia della gravidanza extrauterina nei periodi avanzati) *Gazzetta medica* Milano 1916 lxxviii, 29

The author believes that after the sixth month active intervention is necessary. If the fetus is dead operation can be delayed for about a week if the condition of the mother permits it. If the fetus is alive the termination of the pregnancy can be awaited.

Intervention can be made vaginally or abdominally. In the former the colpotomy incision must be sufficient to allow free passage of the head. Introduction of the hand or external maneuver are generally to be discountenanced and it is best to allow spontaneous placental climination.

Abdominal extraction is indicated only when the conditions are unfavorable for vaginal extraction. Median incision is the rule but when the sac is developed in the large ligament the Pfannenstiel incision is resorted to. Difficulties in abdominal extraction are ascribable not to the fetus but to the treatment of the annexes. These may be left intact or they may be partially or totally removed. The latter is the ideal way. In leaving the appendages behind there should be partial or complete closure of the abdomen. Partial closure finds its indications in septic or suspected cases when the sac and the placenta are firmly adherent or dangerously implanted on other organs, such as the liver, bile-ducts, etc. or when the placenta is very difficult to remove. In this case the technique is reduced to the opening of the abdomen and the sac, the extraction of the fetus tamponing marsupialization of the sac, and partial abdominal closure. Total removal of the ovarian tissues is the ideal procedure and the most correct surgical method.

W. A. BREXMAN

Arnold J. O. Some Practical Points in the Treatment of Eclampsia *Therap. Gaz.* 1916 4, 381

Arnold believes that a judicious combination of the Stroganoff or conservative method with some of the best of the more radical measures is in most cases productive of more satisfactory results than an attempt to follow either school alone. The Stroganoff method in several of the large European maternity hospitals has reduced the mortality in eclampsia from 20 per cent or more to 8 per cent or less. It is, consequently, the duty of obstetricians to give serious consideration to such a method and so far as possible to adopt it in practice for no other treatment has ever given half so low a death rate.

Most American and English obstetricians however believe that the uterus should be emptied whenever one or more convulsions have occurred. Consequently the author feels that after the convulsions have been controlled by the Stroganoff method it is logical to terminate pregnancy by whatever procedure will give the least shock to the patient.

Arnold's plan of treatment is in brief:

1 Chloroform if necessary in the smallest possible quantity that will enable one to give the first dose of morphine without disturbing the patient.

2 The first dose of morphine at least half a grain to be repeated in two hours or as soon and as often as is necessary to control the convulsions.

3 Bleeding as early in the attack as possible to the extent of from 12 to 24 ounces sufficient to effect lowering of the blood pressure.

4 After cleansing the lower bowel, the administration by rectal seepage of a solution containing 1 or 2 drams of sodium bromide and 2 or 3 drams of sodium carbonate to a quart of normal saline as rapidly and constantly as it may be absorbed. In case of rectal intolerance he advises a solution of 2 drams of bicarbonate of soda to the pint of normal saline by hypodermoclysis.

5 In cases before the eighth month after two or three convulsions induce labor. After the eighth month terminate pregnancy by the most appropriate method.

6 With the possible exception of water, no drugs or food are to be given by mouth until long after the convulsions have ceased.

The author reports 17 cases with a mortality of 5.

He states that in every case in which treatment was carried out efficiently from the start the results were good. Some of the consultation cases seen late were moribund and could not have been saved by any method of treatment. F. C. IRVING

Boyd G. M. The Indications for Caesarean Section *Am J Obst. N. Y.* 1916 lxxiii 650

The author believes that the low maternal mortality from caesarean section within recent years has led to an almost reckless broadening of the indications until at the present time this operation is performed far too frequently. He considers pelvic deformity in which the true conjugate is less than 7.5 cm. and pelvic obstruction as the only definite indications. As long as the etiology of eclampsia is obscure, its treatment by means of caesarean section is questionable. In rare cases he thinks it worthy of consideration but considers manual dilatation and rupture of the membranes, followed by

version or forceps, the better method of treatment for most cases. It is to be considered in some cases of placenta previa and is the method of greatest safety for central placenta previa. He questions certain so-called indications as face, brow occiput posterior positions, pyelitis, and primary inertia. He urges that the test of labor should be given the patient in all cases in which the indications are only relative.

C. H. D. via.

Costa, N. P. Segmental Cesarean Operation (Cesarea segmentaria). *Seminario med.*, 9 6 xxi, 55

Under this title are included those procedures which involve the lower segment in contradistinction to the classical cesarean operation which always involves the uterine body. The group includes supraumbilical inguinal, cervical posterior sections and laparocolpohysterotomy.

The author refers to the various procedures since Jorg of Leipzig in 1807 and Omander about the same time first exposed their technique. Ritgen put the extraperitoneal method into practice in 1821. Thomas, of New York in 1870 revived the technique of Ritgen and the statistics published later by him and his followers showed a maternal and fetal mortality of 50 and 42.8 per cent respectively which was no higher than the mortality from the classic operations.

In more recent times the methods were multiplied and according to Holzapfel and Franck there were in 1907 no less than seventeen distinct procedures. The author summarizes each of these methods which he states may be arranged in two great groups, the extraperitoneal and the transperitoneal. The first was founded on anatomical principles, the transperitoneal method arising as a necessity due more or less to the difficulties of technique which in the majority of cases sufficed to completely nullify the object of the intervention. Franck originally followed the extraperitoneal route but owing to the difficulties encountered was the first to try the transperitoneal and published his first seven cases in 1904. His procedure was later modified by Sellheim, Latzko and others.

Accidents are more numerous by the extraperitoneal route owing to the anatomical difficulties and conditions arising which cannot be foreseen. The most common accident is peritoneal injury and according to the statistics of Jeannin and Schauta the peritoneum was opened in about twenty per cent of the cases. Novvian's statistics showed 3.3 per cent, but Latzko and Doderlein by their procedure reduced the figure to 1.5 and 7 per cent respectively.

The next most frequent accident was vesical rupture which occurred in about 3 per cent of the cases. These and other lesser accidents are, however, reduced to a minimum by the transperitoneal method. Sometimes the terine muscle is lacerated or torn. As late accident fixation of the uterus to the abdominal cleftrix has been observed, and this facilitates retroflexion. Such adhesions, ac-

cording to Wiebel are met with in 25 per cent of the cases but they rarely cause a premature delivery or a grave dystocia.

The principal indication for a segmental cesarean operation is in a case where the classic operation is contra-indicated, i. e. a case with infection. This indication, however has not borne the brunt of criticism because the transperitoneal procedure with its provisory sutures is not capable of hindering contamination of the peritoneal cavity or preventing the evolution of fatal peritonitis.

Sellheim from his studies considered that segmental cesarean section was the only treatment in placenta previa and in six cases so treated by him and one by Henkel there were no deaths.

The general opinion however appears to be that this procedure cannot compare with pure obstetrical procedures with the classical cesarean section except in very special cases or in case of complete dystocia. Any other condition which contra-indicates the classic operation are indications for the segmental i. e., threatened rupture of the uterus or incomplete rupture of the lower segment pulmonary tuberculosis, meningitis, pelvic tumors etc.

The author believes that owing to the one hand to the great number of cases of subsequent rupture in the scar and the adherence of the uterus to the abdominal wall and organs in the classic cesarean, and on the other hand to the absence of such complications and more especially the firmness of the segmental cleftrix, this intervention should be studied further and an endeavor made to give it broader indications. Concerning the maternal and fetal mortality and morbidity the author refers to Jeannin's statistics, published in 1900, which gave 5 cases with a global mortality of 7.3 per cent. Eliminating eight deaths due to infection reduces the figure to 5.33 per cent. Latzko's statistics, omitting infective deaths, gave an operative mortality of 4 per cent, Novvian's 3.6 per cent. Bumm's 2.85 per cent. Wiebel's 3 per cent.

Jeannin's statistics showed more or less grave post-operative complications in about 30 per cent of cases. Novvian's 4 per cent. Fetal mortality varies according to the different statistics from 1.15 to 3.6 per cent including deaths prior to intervention. Asphyxiated births compare favorably with the classical operation.

According to the statistics the segmentary cesarean operation has an advantage of more than 50 per cent over the classical operation. Among the principal objections to the classical operation, as pointed out by Sellheim, are hemorrhage, intestinal laceration, difficulty of infection of abdominal cavity by the introduction of amniotic fluid and blood, epiploic adhesions, danger of electrical rupture in later labors, frequency of abdominal hernia, etc.

Schauta has pointed out that most of these are merely the result of faulty technique and thinks that segmental cesarean section lacks the advantages claimed for it and that the probability of infection is greater. Although opinions are divided the

author concludes that dominant opinion at present is for uncomplicated cases the classical operation for suspicious cases the segmentary and for manifestly infective cases a Porro or utero parietal tuba operation W A Bar

Beach R. M.: The Management of Ovarian Tumors Complicating Pregnancy Labor and the Puerperium. *Am J Obst & Gyn* 1911 viii 1029.

From the frequency of ovarian tumors and their infrequency as a complication of pregnancy the author reasons that these tumors do actually prevent conception. A thorough routine examination of all antepartum cases as early in pregnancy as possible will do much to eliminate the danger of the situation. Beach finds that the main complications of torsion, rupture and suppuration, occur in 5 to 30 per cent of the cases associated with the pregnant or puerperal state.

The author believes that ovarian tumors discovered during the first half of pregnancy should be removed by ovariectomy before the second half of pregnancy. If the tumor is discovered during the second half of pregnancy it should be removed if of considerable size since the excessive distention of the abdomen might tend to interrupt pregnancy. A waiting policy should, however, be chosen for other cases, such as dermoids, broad ligament tumors, pelvic bound tumors and bilateral tumors in the childless woman.

Non-obstructing tumors discovered during labor should not be operated upon if labor is progressing well. Obstetric manipulations should be limited and labor made as easy as possible.

Obstructive tumors seen during labor are considered under three headings: (1) Clean cases seen early in labor may be treated by posture and reposition, cesarean section plus ovariectomy or waiting until full dilatation of the cervix, which is dangerous owing to the possibility of rupturing the cyst. (2) Clean cases at the end of the first stage should be operated upon as that method gives the best insight into the condition present. (3) Infected cases seen late in labor must be operated upon at once. Cases that pass through labor should be operated upon during the puerperium.

C H Davis

Danforth W. C.: Pyelitis of Pregnancy with Especial Relation to Its Etiology. *S & G* 1911 96 xxii, 23.

The author made simple cultures on Flood's medium of the urine of 50 pregnant women. In only five of these were colon bacilli found. The remainder showed a growth of staphylococcus. A further series of 14 was much more carefully studied; the urines being cultured in agar plates to which human ascites fluid had been added in agar shake cultures and in anaerobic tubes of agar to which had been added human ascites fluid and goats blood. None of this series showed colon bacilli. One showed a

pseudodiphtheria bacillus, one an unrecognized spore-forming bacillus. With the exception of a few which were entirely sterile the remainder showed staphylococcus.

An observation is included upon a case in which the ureter was catheterized to relieve distention of the right kidney pelvis. The catheter would not pass up the right ureter although it passed up the left one readily. Upon placing the patient upon the left side to permit the ureter to gravitate away from the ureter the catheter passed up the ureter very readily and unimpeded rapidly from the catheter. It is assumed therefore that obstruction of a mechanical character can be caused by the ureter. As colon bacilli were so infrequently found the author assumes that the infection is in the majority of cases a blood-borne one.

As to treatment in addition to postural methods the use of the ureteral catheter is urged previous to distending upon emptying the uterus. The author believes that a considerable number of cases may be relieved by this means. Nephrotomy and nephrectomy are discussed.

Norris, C. G.: Pregnancy in the Tuberculous. *Am J Obst & Gyn* 1911 96 l viii 99.

The study of this subject has led the author to believe that as a general rule pregnancy and especially the puerperium exerts an unfavorable influence upon the course of tuberculosis. Whether the normal pregnant woman is more susceptible to infection by the tubercle bacilli is still an open question. It is certain that a definite proportion of women apparently contract the disease either during pregnancy or the puerperium. This is particularly true of the wives of tuberculous men living in an unhygienic surroundings.

The combined results of fourteen observers show that the average infant mortality in a large series of cases was 38.83 per cent. Armand Delille studied a series of 8 children born or living in 175 families, one or more members of which were tuberculous. Of these children 323 were placed in the country and did well, 306 even removed from their infectious surroundings and of these 235 developed tuberculous.

Apart from the exacerbation of the pulmonary condition which occurs so often during pregnancy, it seems that these patients are more subject to the various obstetrical complications than normal individuals.

Alberk of Norway treated 16 patients in a private sanitarium, yet 6 died within fifteen months. Lissen-Moeller reports that death or aggravation occurred in 50 per cent of his patients treated in private sanitariums. Ebeler from a study of 32 cases advises the immediate emptying of the uterus in any month of pregnancy. Barry reports that in a series of 38 cases all of the severe type, 50 per cent died within two months after labor. Bacon estimates that 33 per cent of tuberculous women die in less than one year after labor.

Practically all authorities recognize the gravity of laryngeal tuberculosis. Fellner in a series of 380 cases had a maternal mortality of 44 per cent. Lobenstein collected 23 cases of laryngeal tuberculosis from the literature 200 or 86 per cent of whom died during pregnancy, labor or soon after and Raspine emphasizes the ill effects of this condition. The death-rate among the infants of these patients was about 60 per cent. Imhofer reports a fetal mortality of from 86 to 90 per cent when the mother has a laryngeal involvement. Kneitner 90 per cent and several others give similar figures.

Tuberculous women should not nurse their children, except in exceptional circumstances, for the mother's sake and because of the dangers to the child.

Unfortunately despite the most painstaking studies, it cannot be determined with certainty which women will bear pregnancy and the puerperium well, and which will fare badly. The safest plan for the tuberculous woman is to avoid conception. In those exceptional cases in which conception has been countenanced, strict hygienic measures must be enforced and the woman kept under close observation and examined at frequent intervals by the experienced internist.

In the early months of pregnancy with a rapidly advancing pulmonary lesion, there can be no question but that the induction of abortion should be performed without loss of time and this is also true if laryngeal involvement occurs. On the other hand, given a similar case in the late months of pregnancy little can be gained by the induction of premature labor. The author believes that in the presence of an extensive lesion, even in the quiescent period or even of a small active lesion, or any laryngeal lesion the uterus should be emptied at once. The longer a lesion has been inactive the better the prognosis, as a general rule.

The combined statistics of 1 observer, comprising nearly 1,000 cases of intervention within the first four months indicate that 77 per cent of the women were benefited by emptying the uterus, the percent age varying from 20 to 97 per cent. The author believes that the wise obstetrician will familiarize himself with the results obtained by others, and that he will individualize his cases, and empty the uterus only when it is necessary but that he will not allow his natural repugnance to the performance of this operation to influence him to the detriment of his patient, if after consultation it seems advisable.

C. H. DAVIS.

Vantrien. The False Appendicitis of Pregnancy (Les fausses appendicites de la grossesse). *A. N. de gynéc. et obst.* p 6 xiii, 77

The author reports five cases in which there was a diagnosis of appendicitis, all the clinical signs apparently being precise and conclusive, but which proved wrong on intervention.

In the first case a gangrenous diverticulum showing all the symptoms of appendicitis called for urgent

operation. The appendix was found absolutely normal. In two other cases the trouble was found to be due to a suppurated dermoid ovarian cyst. The fourth case was very interesting. It presented all the classical signs of sudden pains in the right lower abdomen, particularly located over McBurney's point. Intervention, however, showed the cecum and appendix to be healthy with a hematic collection above them which extended into the iliac fossa as far as the uterine cornua behind and the broad ligament below. A disrupted impular pregnancy on the right tube was found coincident with a small uterine pregnancy which continued to term.

The fifth was a post partum case which was found to be due to the twisted pedicle of a partially suppurated ovarian cyst, the symptoms of which simulated appendicitis.

W. A. BRIDGEMAN.

LABOR AND ITS COMPLICATIONS

Grav, H. Fetal Dystocia and Cesarean Section *Med. Rec.* p 6 lxxix, 137

The author reviews the various forms of treatment of fetal dystocia with a plea for the more frequent performance of cesarean section for this complication.

The various forms of fetal dystocia are classified as follows:

Fetal dystocia from faulty attitude (1) excessive flexion of the head, Roderer's obliquity (2) Bregma presentation, incomplete flexion (3) brow presentation (4) face presentation (5) presentation of ant nor parietal bone or ear Naegele's obliquity (6) presentation of posterior parietal bone or ear Lutmann's obliquity.

2. Fetal dystocia from faulty presentation (1) pelvic presentation (2) shoulder presentation (3) fetal dystocia from faulty position (1) persistent occipitoposterior position (2) persistent mentoposterior position.

3. Fetal dystocia from general fetal conditions (1) multiple or compound presentation (2) multiple birth (3) malformation (4) deformities (5) anomalies.

5. Oversize of fetus.

6. Oversize of head.

7. Premature ossification of head.

8. Congenital hydrocephalus.

In many cases of delayed labor due to fetal dystocia haste is unnecessary, a quick and immature conclusion should be avoided. The history of the case must be fully considered whether the labor is at term or over due, the duration and progress of labor, the nature of the uterine contractions, especially as to the efficiency, the general condition of the mother, the condition of the amniotic sac, the condition of the fetus, and of the uterus and the condition of the rectum and bladder. Full information as to the above points will serve to assist in determining the proper procedure to follow. Having obtained a full history of the case a careful examination of the mother and fetus should be made.

Under full anaesthesia the whole hand if necessary should be passed into the vagina and an effort made to correct any faulty attitude or position and if possible to engage the head in the pelvis. By allowing labor to continue many faults will be spontaneously corrected by the forces of nature or rendered amenable to an easy forceps delivery.

Under operative treatment the author disregards embryotomy upon the living child, pubiotomy is not considered.

The high forceps operation is regarded as a dangerous procedure for both mother and baby and justifiable only under exceptional circumstances. The high fetal mortality and considerable maternal morbidity of version should cause it to be regarded as a formidable procedure.

For clean cases cesarean section is the ideal mode of delivery yet its dangers, shock, hemorrhage and sepsis must be weighed against the dangers and limitations of the alternative operations.

PHILIP F. WILLIAMS

Telfair J. H. Rupture of the Uterus During Labor
Am. J. Obst. & Gyn. 96: 133, 1955

The author gives a brief discussion of this subject reviewing some of the recent literature and showing that one of the more common causes working to increase this condition at the present time is the reckless use of pituitrin in the general practice of obstetrics. He reports two cases of rupture of the uterus during labor, the first occurring during the process of what was apparently a normal labor in a slightly poorly nourished woman and the second probably caused by using rather large doses of pituitrin in a case having a generally contracted pelvis. Following the rupture both cases were operated upon, one dying seven hours after operation and the other on the fourth day from peritonitis.

In the discussion of this paper a number of cases which have not been recorded in the literature on this subject were reported.

C. H. DAVIS.

Nicholson W. R. Anaesthesia in Labor. *Ther. & Gyn.* 1916: 388.

Nicholson estimates that about 15 per cent of normal women in normal labor really need anaesthesia, not merely to accomplish delivery successfully, but to do so without evil after effects. The remaining 85 per cent could probably be delivered as satisfactorily without anaesthesia as with it. With this in mind it behooves the obstetrician to select an anesthetic for use in labor which is not only efficacious but also safe for mother and child.

Chloroform is an efficacious anesthetic and easy to administer but its danger is great enough to preclude its use. Its margin of safety is narrow and its secondary results are frequently serious.

Ether is the safest of anesthetic agents. Its use as an analgesic has been quite satisfactory. It is cheap and easily administered.

The experience of those in this country having had a considerable experience with the scopolamine

morphine narcophan pantopon method varies from practically complete success to marked failure. At best it should only be used as an adjuvant to the first stage. As a means of procuring a painless delivery it is non-efficient and dangerous, the danger being due to the impossibility of individualizing the patients together with the uncertainty of the action of the drugs and also their relatively slow elimination.

Nitrous oxide and oxygen after one has had some experience in the use of the apparatus will be found 100 per cent efficient instead of failing in from 10 to 40 per cent of cases as does scopolamine. In the hands of a capable anesthetist nitrous oxide and oxygen is no more dangerous than ether. Its administration especially to the deeper surgical degree should not be attempted by one unskilled in its use. With this anesthetic there is no increased tendency to asphyxia neonatorum nor is labor prolonged nor is post partum bleeding increased over the normal.

F. C. LIVING

Ferreira F. Obstetrical Analgesia by Epidural Injections of Novocaine (La analgesia obstetrica por inyecciones de novocaina de novocaina). *Cron. Méd.* 96: 37.

Ferreira reports the details of five cases in which he made injections of novocaine solution combined with sodium bicarbonate and sodium chloride according to the method of Lowen as an obstetrical analgesic. The injections were made in the ligamentous membrane of the sacral region, and gave favorable results.

W. A. BRENNAN

Iraeta, D. Analgesias in Parturition (Los analgesicos en el parto). *Terap. Buenos Aires* 9: 6.

Morphine as well as other analgesic derivatives of opium given during labor may produce slight symptoms of intoxication but may cause the death of the fetus. As to the sensational discovery of Paulin of Paris that in obstetrics morphine can be separated from its toxic substances, without influencing its analgesic properties, the author accepts it with the suspicion of the existence of an oxytocic in the product injected, basing the suspicion upon the presence before the period of analgesia of a short period of hyperesthesia and a concomitant increase in the intensity of the uterine contractions.

The author in collaboration with Houssay and Beruti had succeeded in detoxicating morphine by the use of ferments. This product newly obtained was injected in different animals and it was demonstrated that the new product was of greater toxicity than morphine itself. Injecting in a series of parturient women a solution of ferments it was found that it had an oxytocic action more ephemeral than that of the hypophysis.

Clinical experimentation showed that major doses of 0.02 g. of morphine caused an increase in the intensity of the contractions immediately after the injection and that the pain decreased much sooner.

The author has devised an apparatus, inexpensive and easily manipulated, to register uterine contractions and to combine direct observation with external hysterography.

Internal hysterography must be abandoned in his opinion for the following reasons:

1. The balloon is difficult to place if there exists no relative dilatation of the cervix, and more difficult to place when the head has passed the perior strait.

2. During the expulsion period, the balloon is pushed out with the progress of the foetus.

3. The entire apparatus introduced into the uterine cavity is an excitator of the contractility of the organ and modifies its rhythm and intensity.

4. If the bag of waters is intact the balloon pushed in may break it and give rise to dystocia.

5. It is difficult to avoid displacing the balloon when it is in the uterus.

6. It is dangerous to the mother as well as to the foetus to introduce an apparatus into the uterus.

The difficulties encountered have resulted in the abandoning of this method.

The apparatus consists of the brassart of Pachon, moderate and a Marey's drum.

The brassart inflated and held by means of leather straps, is applied to the abdominal wall in the region of the fundus of the uterus at a point where it is not influenced much by the respiratory movements.

The rubber tube that starts from the brassart is placed in communication with a small Barnes bag, placed in an ordinary milk bottle, whose other tube opening is united by another rubber tube to Marey's drum. The author also uses an apparatus consisting of a drum, one face of which, flexible and provided with a spring, is put in contact with the abdominal wall by means of a spring the other rigid, holds a tube which communicates with a Marey's drum.

The registering cylinder used is one of the Bartsch type, of a voluntary regular movement. As the registrations indicate the time of the beginning and termination, one can easily calculate to any segment of the graphic, the duration, the intensity and the frequency of the contractions.

The objections which could be raised against this procedure may be due to the operator and the selection of the case. In the author's experience the apparatus gave only indications relative and comparable in the same subject and at the same session.

The high and low altitude of the register depends upon the degree of compression of the apparatus on the abdominal wall and it is very difficult to find it the same in different subjects.

The height of the tracing which corresponds to the intensity of contraction, is not represented on the graphic, because the air pressure in the drums increases with the progress of contraction, and, therefore during the last half of the contraction the resistance opposed would be much greater than at the beginning, consequently the height of the tracing will be lower than for the first half.

A question which arises is: Are the traces on the registering cylinder or graphic, the signs of uterine contractions only or are they the traces of contractions of the abdominal muscles also? The author states that the contraction of the abdominal muscles during the period of dilatation is a factor that disturbs the register very little because the corresponding muscles remain passive during the period of labor.

In an illustrative case a woman was chloroformed, and the apparatus applied; the registrations of the contractions were equal before and during the anesthesia.

The author's experiments upon women and animals led him to the following conclusions:

1. Morphine maintains the activity when mixed with hypophyseal solutions.

Internal hysterography must be discarded for it is dangerous to both mother and foetus.

3. In the study of uterine dynamics use should be made of external hysterography which is harmless.

4. A dose of morphine 0.005 g per gram of animal weight is fatal to guinea pigs.

5. Morphine is not detoxicated by hypophyseal solutions.

6. The leaves of grain or beer not only fail to detoxicate morphine but seem to increase its toxic effects in animals.

The physiological action of analgesin and pantoanalgesin according to the renal pressure and the uterus, is equal to that of morphine.

8. The combination of large doses of morphine to small doses of hypophysis annihilates the oxytocic action of the last named.

9. Solutions of leaves have less oxytocic action than those of the hypophysis.

10. The generalized opinion that pain and pregnancy are factors opposed to morphine intoxication is of no value.

Morphine injected in a pregnant woman may be transferred to the fetal circulation without changes.

1. The sensibility to the toxic action of morphine is greater in children.

3. The personal susceptibility to morphine varies greatly in different individuals.

4. In some parturients the initial dose of morphine does not relieve the pain instantly but it soon relieves the succeeding ones.

15. In 40 per cent of cases there is no indication for the administration of large doses of morphine for the relief of labor pains.

16. Products having morphine for a base, intended to produce analgesia in parturition are of inconstant action.

7. The injection of these products during the period of expulsion has little effect; their administration in obstetrical cases is not only unnecessary but injurious.

18. Opium derivatives do not relieve labor pains without changing the uterine dynamic, diminishing the number and intensity of the contractions.

19 Parturient women subjected to such analgesics suffer more or less from symptoms of morphine intoxication

20 Compounds with morphine as a base may in toxicate a parturient woman without decreasing labor pains.

21 Generally speaking the periods of dilatation and expulsion are prolonged in analgesized parturients

22 The duration of labor is approximately nine to ten hours for multiparae and twenty four hours for primiparae.

23 Artificial rupture of the membranes must very frequently be performed in analgesized women

24 Analgesics increase the necessity for obstetrical intervention.

25 Opium derivatives used as analgesics in parturition intoxicate the fetus in about 38 per cent of cases

26 The administration of morphine compounds to a parturient woman may cause the death of the fetus.

27 Chloroform by the drop method may be used as a harmless analgesic and should be used in preference to all other anodynes

28 The administration of chloroform in surgical doses produces serious disorders in the uterine dynamics

RAOUL L. VIGORIN

Olivella, R. and Arteaga, I F Parto-Analgesia (La partonalgia) *Rev Méd d S Illa* 9: 11 99.

In 7 reported cases the author has used the preparation recommended and used by Cantón de Buenos Aires as a parto-analgesic. This preparation is composed of

Chlorhydrate of morphine 4 centigrams

Hypophysis extract (fresh gland) 10 centigrams

Sterile vehicle 1 cubic centimeter

The author found that in all cases pain was diminished notably and in fact was not appreciable except at the passage of the head that the contractions persist that the parto-analgesic produces marked somnolence that the digestive, circulatory, respiratory and urinary apparatus were not affected that post partum vomiting occurred in only one case that involution was normal that the child in only one case was born asphyctic and in this case recourse was had to artificial respiration that the infants during the first twenty four hours were unperfected and dull and required watching

W. A. BRENNAN

PUERPERIUM AND ITS COMPLICATIONS

D Lee J B: Puerperal Infection *Chc g M Recorder* 9: 6 11 34

The statistics of 1914 show that 3 500 women died in the United States from puerperal infection that 10 women per day died in the United States from puerperal infection during that year. This is the reported number from the 66 per cent of the reg-

istered population of the United States which means that the deaths are reported and are received at the Census Bureau at Washington. In addition to those dying from puerperal infection there are a large number of women who die under an entirely different diagnosis

It is generally considered that puerperal infection is due to an infection of the parturient canal by germs and probably that is true. It is believed that the streptococcus causes most of these infections. Probably that is true too but other germs likewise cause puerperal infection such as the staphylococcus (three kinds) the gas bacillus in rare cases and in rare instances the diphtheria bacillus. How these infections get in however and why one woman is infected by a bacterium that leaves another woman intact we do not know

One factor that has a great deal to do with the incidence of infection is the epidemic influence. At certain seasons of the year the bacteria that are ordinarily present in the room and in the dust and air acquire the highest degree of virulence

The conduct of labor has as much to do with the prevention of infection as the asepsis of labor. To put it in a nut shell the asepsis of the labor the sterilization of gloves and hands and all implements the handpiece the mouthpiece that go with the proper aseptic conduct of labor are not all there is to be done in the prevention of puerperal infection. To this must be added the proper conduct of labor

Considering all cases of puerperal infection at the start because that is the time when local treatment if it does any good at all should be instituted we can make the sweeping declaration that the local treatment of puerperal infection has seen its day. There is still a rather marked difference on one point regarding local treatment. There are those who believe that if the physician is convinced there is decomposing material particularly placental in the uterus it should be removed at once. If a woman has an undoubted puerperal infection and has a piece of placenta in the uterus the greatest danger she runs is the danger of hemorrhage and it has been the authors practice wherever hemorrhage did not exist to leave the piece of placenta in the uterus until the protective barrier which Nature throws up against the advancement of the infection has been thoroughly established and enables the uterus to be invaded without the danger of spreading the infection. However if hemorrhage interferes with this expectant treatment something has to be done and there is the choice of two remedies one tamponing the uterus and stopping hemorrhage that way hoping when the tampon is removed that the piece of placenta will come with it and the other is immediate manual digital rarely instrumental removal of the piece of placenta. That such a course of treatment is successful and is not dangerous has been proven time and again and has been proven by the respectable minority of men who believe in that form of treatment. The protective wall of granulation should not be disturbed

If a piece of placenta in the uterus is infected and is causing puerperal infection, by the time the woman has had the first chill the bacteria are far beyond the uterine wall. They have gone into the blood into the connective tissue, if they are going at all.

If a woman has a hemolytic streptococcus in the uterus, whatever is done to the uterus helps very little because the infection has gone beyond the reach of anything that can be done locally. If also has not a streptococcus hemolytic infection, it makes little difference what is done, because the infection is superficial and in the course of time will be cast off by itself but one should avoid doing any thing which would convert a non-virulent invasive organism into a virulent and invasive one. The question is asked: Would not a piece of placenta decomposing in the uterus in itself conduce to the development of invasive qualities of a hitherto non-invasive and harmless organism. This question? has been answered Yes and No. It has been said that the streptococcus living as a parasite is harmless in the genital tract, but given enough placental tissue and blood to feed on, it will develop invasive qualities, and by removing the pabulum the streptococcus will not develop these qualities. This has not been proven by experience. It has been shown time and again that if a wound that is granulating nicely in which Nature is throwing off infection in a successful way is opened and the granulations broken down, a veritable inoculation of the woman with bacteria is produced.

The other methods of treatment: vaginal douches, while not very harmful, are not entirely harmless; they do no good and had better not be given. Brushing the uterus with tincture of iodine the author discontinued long ago but one form of local treatment he still insists on and that is the removal of perineal and cervical stitches. He believes in providing free drainage. If there is plenty of room for the secretions to get out, then there is a greater chance of overcoming the infection. Outside of the removal of the stitches the author uses no local treatment.

In the general treatment he still uses antistreptococcus serum. If a patient comes down with chill, high temperature prostration, and presents the symptoms of streptococcal infection he gives 500 ccm. of the serum. If she does not make a marked improvement, he discontinues the treatment. The author has not seen any complications arise from pains in the joints and urticarial eruptions.

DeLee uses very few vaccines because he has seen no benefit from them. Neither has he seen much, if any beneficial effect from collargol and electrargol. Normal salt solution is a good diuretic but he has not had the wonderful results from it that his colleagues report.

The author's advice is: Do not be in a hurry to open a pelvic abscess. Of course, that does not mean you will sit by and let it break into the bowel or the general peritoneal cavity or break out on the skin. Do not be in a hurry to take out a pus tube

after puerperal infection. He has never taken out the uterus for puerperal infection, and he notes that there is great conservatism manifested in the operation of removal of the uterus.

In the prevention of puerperal infection he lays particular stress on the method of conducting labors in the hospital: also the chances of infection being spread after sterile supplies are exposed to the air.

EDWARD L. CORDELL.

Hedblom, C. A. A Case of Phlebitis Migrans. *J. Am. M. Ass.* 9 6 1917, 777

A married woman of 26 was in her fourth pregnancy in five years. The first two babies had died of marasmus the third was living and well.

The labor progressed without incident and a 7.25 pound baby was born at the end of the twelfth hour by normal mechanism. No laceration of the perineum occurred. The placenta came away after ten contractions. The uterus was atonic and in spite of ergot and massage there was rather more than the average amount of bleeding, but the pulse did not go above 90.

The temperature remained between 99 and 100.5 for the first ten days of an otherwise uneventful convalescence. On the seventh day the patient had a drenching night sweat and there was a sharp rise of temperature to 104 pulse 120. The breasts were normal the fundus well down and not tender. The white count was 17,000 haemoglobin 60 per cent. There was marked tenderness and some induration over the course of the right saphenous vein, and the leg soon became swollen and oedematous. Treatment consisted in elevation, use of the ice bath absolute rest etc. After three days there was marked drop in temperature and pulse, and, although the tenderness and swelling extended progressively down to the foot, there was a gradual but steady improvement until the beginning of the fourth week. At this time the temperature again rose sharply to 104.5° pulse 135 and marked tenderness, induration, and swelling developed in the right thigh. The patient was nauseated a great deal during the next two weeks, vomited at intervals, and complained of pain in the epigastrium much aggravated by food. The pulse remained about 130, became weak and irregular and there was increasing prostration in spite of the fact that the swelling and tenderness in the legs all but disappeared.

During the sixth week of illness these symptoms recurred first in the left and then in the right leg with pain in both legs and feet which became so severe as to prevent sleep, except after morphine. There followed, however, a period of general improvement during which the patient was again able to take food, and for several days the pulse and temperature remained at about normal. During the eighth week induration, tenderness, and swelling appeared progressively over the left side of the neck, axilla, arm, and left chest. There was also increased swelling in the left flank and lower abdom-

mal wall which was spastic and very tender to palpation. The swelling in both legs increased and pain in the legs and feet became so severe as again to require the administration of morphine. The temperature was from 102 to 103, the pulse from 130 to 140 and at times almost imperceptible. During this recrudescence which lasted about two weeks gangrene developed over the anterior aspect of both feet which resulted finally in the separation of the whole thickness of the skin and partial sloughing of the tendon-sheaths.

After another interval of improvement there was a fourth relapse during which the right side of the neck, the right axilla and arm became involved and then successively the occiput, whole scalp and face. During the height of this attack sharp pain developed in the chest aggravated by deep respiration but no friction rub or other signs were elicited. There were nausea and vomiting lasting several days. The voice became husky and the patient complained of severe headache and pain in all affected parts but most marked in the feet. The symptoms abated toward the end of the tenth week for a period of about twelve days. This was followed by the sixth and last relapse characterized by abrupt rise of temperature from normal to 102, the pulse was accelerated from 120 to 140 and again became irregular and at times almost imperceptible. At the beginning of this attack there was a good deal of vomiting and violent headaches. The swelling in the neck and scalp which had begun to subside also increased. After four days the patient became erythrovous, suffered lapses in memory and finally became partially irrational for several days. Ophthalmoscopic examination, papillitis of both optic nerves, outline of both disks entirely lost, vision almost normal but with duplication of objects.

The patient was discharged in the nineteenth week in good general condition. Nine months after the onset of the illness there was no swelling or disability the patient was in excellent health and of maximum weight and was able to play golf and tennis. She was admitted two months after this time and an appendectomy done for subacute appendicitis.

ED. ARD L. C. & TELL

MISCELLANEOUS

Commisskey L. J. J. Routine Wassermann Reaction in Hospital Obstetrics. *Am J Obst* 1919, 66, 1391-1406.

This report is based on the routine Wassermann tests in 1822 mothers and 1004 newborn infants, the larger number of mothers being due to the fact that the women were subjected to the test eleven months earlier than the infants as a routine and also that some mothers left the institution undelivered. Of the mothers tested 145 or 8 per cent were

positive 26 or 14 per cent were doubtful and 11 negative or 0.6 per cent had infants whose reactions were positive or doubtful. Only 6 or 18 per cent of these women with positive reports gave any history or showed any signs of syphilis leaving 119 or 52 per cent with positive reports who showed neither clinical evidence nor gave a history of the disease. From this it can be seen that many cases would have escaped diagnosis but for the routine Wassermann reaction. The conclusions are as follows:

1. The routine Wassermann reaction is the ideal method for the detection of syphilis in the pregnant woman or as near the ideal as our present knowledge will permit.

From this comparatively small number of cases it would seem that syphilis has but a slight influence on the length of gestation but does seem to produce a much higher percentage of stillborn infants.

That the use of the blood serum from the umbilical cord for the treatment of others is unwise and dangerous, without the Wassermann being done upon both the fetal and maternal bloods.

4. That the death rate among children of Wassermann positive mothers is four times greater during the first ten days of life than in the case of children where both mother and child are negative.

C. H. Davis.

Iyer H. N. A Case of Siamese Twins. *I J* 1919, 11, 3.

The author reports a case of a woman aged 26 VI para who had been in labor for three days. Upon her arrival he found a fetal head and left forearm delivered. These had been exposed for six hours. On vaginal examination a second head, with its face turned toward that of the delivered one, was found. Attempts to push this head into the uterus failed. With some difficulty forceps were applied to the undelivered head with gratifying results. A common placenta was delivered shortly.

The twins were found to be attached by the rib cartilage. They were lying on their sides facing each other and the left hand of one was between the heads. The heads were distinct and all facial organs well formed. There were four hands, four legs, two separate vertebral columns and a common abdomen covered only by pentoneum. There were two separate pelvic bones and male organs. A single cord passed under the pentoneal covering of the abdomen. The small and large intestines were found occupying both portions of the abdominal cavity. There was a single liver and spleen. There were two pairs of kidneys, a single heart, two lungs and a common diaphragm. A case of Siamese twins — both stillborns.

ED. ARD L. C. & TELL

GENITO-URINARY SURGERY

ADRENAL, KIDNEY AND URETER

D. VILLA, S. A Case of Malignant Tumor of the Right Kidney in a Child of Four Years (Sopra un caso di tumore maligno del rene destro in un bambino di 4 anni) *Riv di cl. pediat.* 9 6 xiv 69

Malignant tumors of the kidney which are frequent are fairly familiar in pediatric literature. During the past years in the pediatric clinic of the University of Rome, 14 such cases have been observed.

The first impression given by the case reported by DeVila in a girl of 4 years was that of an echinococcus cyst of the liver. The differential signs, however, ruled this out as well as other possible tumors, and the ultimate diagnosis of tumor of the right kidney was arrived at and intervention decided upon.

Under chloroform an incision was made in the cecal region and the cecal peritoneum opened up. On clearing away the pericecal tissues and adhesions the tumor was found. The adhesions were between the anterior face of the tumor, the abdominal wall, and the colon. Luxating the tumor through the wound it was found to be attached to the right kidney by a pedicle. With its appendages the tumor weighed early 800 grams.

Histological examination showed that the tumor consisted wholly of sarcomatous, partly myxomatous connective tissue, except at its inferior pole, where there was a zone of integral renal substance. In the lower pole was also found a urinary cyst and some small hemorrhagic cysts. The tumor was composed mainly of fibrous fascia and young fibroblasts. This is the usual finding in histologic examination of malignant tumors of the kidney in children.

The subsequent operative history of the child shows that except for a bronchopneumonia there were no complications and five months later there was no evidence of recurrence.

The author gives a summary of the previous cases which are recorded in the clinic. The general mortality of non-operated cases is 100 per cent. In the operated cases the operative deaths averaged 40 per cent, deaths by recurrence after operation, 45 per cent, definite recoveries, 7 per cent.

W. A. BRIDGMAN

FRASER, A. The Origin of Hypernephroma of the Kidney *Surg. Gynec. & Obst.* 9 6 xiii, 645

Of 34 so-called hypernephromata studied by the author on was almost undoubtedly a neoplasm originating in an accessory nest of cortical adrenal cells, and

the patient who was a woman, aged 38, was 6 feet in height of excellently developed musculature, the hair on the head, the chest, arms, and legs was thick, coarse and abundant and there was a distinct mustache. The mammae were undeveloped and the chest was of the male type.

In 3 of Fraser's cases of so-called hypernephromata the morphological evidence indicated that the tumors were derived from the tubules of renal adenomata and had no histogenetic connection with the adrenal cortex. For this reason he suggests that the term hypernephroma be used only to include tumors which are undoubtedly of cortical adrenal origin, and that the term neophrimata be applied to that large group of renal tumors to which the designation of hypernephroma is now given. In support of this opinion he points out that the primary structure of adrenal tumors is essentially different from that of tumors of renal origin, that the primary structure of adrenal tumors never imitates that of renal tumors, but that the primary structure of certain renal adenomata can at an early stage through pathological changes imitate the primary structure of tumors of renal origin. Both tumors of renal and of adrenal origin are capable of undergoing secondary degenerative and malignant changes rendering their histological features almost identical.

KRIEG, A. Abscess of the Kidney Cortex and Its Relation to Paranephritic Suppuration (Ueber den Abscess der Nierenrinde und seine Beziehung zur paranephritischen Eiterung) *Beitr. z. Klin. Chir.* 9 6 xxi, 44.

The patient in the case reported by Krieg was a girl of 5. The history showed influenza and frequent neck inflammation. The present disease began suddenly with pains in the right lower abdominal segment, high fever, tendency to vomit, etc. Appendicitis was diagnosed and laparotomy done. The appendix was found to be normal. On the under pole of the right kidney a cherry-sized tough growth was felt. On freeing the kidney this was found to be a cortical abscess. About 30 abscesses from the size of a pin to that of a pea were found scattered on the surface of the kidney. The kidney was extirpated and recovery has persisted for the two years since the operation.

The author thinks that the observations are of importance with regard to unilateral kidney abscesses, in that the case throws light on the method of development of such abscesses. If of hematogenous origin, the cortical abscesses had directly attacked the fibrous capsule and involved the neighboring tissue. By this means the way was opened to the fatty capsule and it is seen that the developed

paranephritic abscess condition had its origin in the cortical abscess

W. A. BROWN

Wilk Surgical Treatment of Nephritis

gutsche Behandlung der Nephritis
A. med. Woch. Nr. 1, 1900

Wilk reports on four cases of nephritis in wounded soldiers in which medical treatment was of no avail, but in which surgical intervention gave excellent results.

In each of the four cases decapsulation of the kidney was done under local anesthesia supported by etherization during isolation of the kidney. After operation the renal activity began to increase in all four cases.

In these cases the author thinks it is not a question of anatomopathological alteration of the kidney but rather a functional disturbance, a promising and diminution of the renal activity due to tuberculin and compression by adhesions of connective tissue which envelop it and which has passed into the cicatricial state after inflammation.

Decapsulation is clearly indicated in such cases and if this procedure in the case of the second kidney should be operated upon.

W. A. BROWN

Kretschmer H. L. and Gaarde F. W. The Treatment of Chronic Colon Bacillus Pelletis by Pelvic Lavage

25

The authors refer to the already published results as to the possible dividing line between pyelitis and pyonephrosis with abscess formation and chyma. General treatment is not sufficient and the results from lavage. The greater the number of suitable cases and the results of the treatment were. The authors have tried the treatment in 15 cases. Cultures obtained from the kidney had to be sterile.

As a rule the growth of the colon bacillus was easy to obtain on plain agar although in some cases it was necessary to try the blood agar. In all the kidney had cleared up this emphasizing the bacteriostatic action as to the lymphatic channels. All four elsewhere. It will never be a cure. One per cent silver nitrate was the main method employed in a case of chronic pyelitis. The treatment was resorted to every three days. Various manipulative treatment as well as various were resorted to. Of 14 cases 4 were cured. Logic cases were observed in 11 instances. From one to eight injections were required. The authors believe that this treatment is more certain and speedy than any other advised and that failure signifies the same such complication in fact as stone or tuberculous.

F. R. CHARLTON

Gilpatrick, R. H. Nephropexy

B. J. M. S.

This author presents a critical review of the most operative procedures for permanent nephropexy in which because resulting in the normal renal function should be discarded. Nephropexy as a curative agent in many cases has resulted in failure because too much was done in operation which does not and cannot cure the disease proper growth but a mechanical defect. This must be a mechanical defect in position or function. It is dependent upon strict adherence to principles of physiology which sling basket and mechanical operations which restrict the kidney.

The author proceeds to discuss the various methods of fixing the kidney through the abdominal wall at the lower border of the rib cage. The capsule is used from the pole of the kidney to the organ. The pole of the capsule is then turned back and three sutures are passed through each by an incision in the abdominal wall. A generous amount of pulp is drawn up in these sutures. The pole of the capsule is then turned back and three sutures are passed through each by an incision in the abdominal wall. The kidney is then placed in position and the sutures are brought out through the incision. The wound is then closed. The uppermost sutures are brought out. When all sutures are tied the position of the kidney is accurately approximated. The position of the quadratus lumborum and the area of incision are marked upon the uppermost must average at least four quires. The muscular edges of the incision are sutured with uterine suture. The kidney is sutured with uterine suture. The operation is completed by closing the incision and the uppermost sutures.

Ten cases have been operated upon according to this technique with successful kidney-embarrassment. The average stay in the hospital is 14 days. All wounds healed by first intention. All patients reported freedom from symptom present before operation.

The author offers the following conclusions:

1. A mechanical problem is better solved under good mechanical principles.
2. Success is dependent upon the degree to which normal anatomical and physiological conditions are approached.
3. The kidney may be wounded fixed or constricted with impunity.
4. Decapsulation is either partial or complete does not impair kidney function.
5. The most rational method of securing the kidney in position after it has become a wandering

to such a degree as to demand operation is that of removing the cause and aiding in the reconstruction of a natural support.

6 Any permanent artificial support is dangerous if not completely destructive to the kidney's functional activity.

7 The rolled-up and transfixed capsular flap offers a perfectly adequate hold for one end of the anchorage and the muscular and fascial layers of the loin the same for the other end, without sutures which emerge through the skin.

8 If the anatomical relations of the kidney can not be permanently readjusted without destruction of its functional activity it should be either left alone or removed.

M. KROGSAVED

Pedersen V. C. A Seven-Glass Urinary Test
V. Y. M. J. 9, 6, cli, 867

The necessity of a clinical means of recognizing prostatic disease apart from seminal vesicular disease and of vesicular disease of one side apart from that of the opposite side, and likewise of the prostate indicated Pedersen to evolve the procedure described. He does not claim that it is absolutely accurate but says that it will furnish the clinical basis of operation very satisfactorily by demonstrating whether the pus is chiefly or solely in the prostate as distinguished from the vesicles or vice versa, or in one vesicle independently of its fellow or of the prostate gland.

The author dwells upon the anatomy of the organs in question, and shows with the aid of illustrations how this test can be logically carried out. It performs this test by two methods, the one-stage and the two-stage. The patient's bladder should be reasonably full of urine or should be filled at the time with normal salt solution. For each specimen 100 to 150 ccm. of urine are necessary.

In the one-stage method Glass 1 is obtained by irrigating the anterior urethra as far back as the cut-off muscle before urination. The wash water will show the amount of involvement of this portion of the urethra.

2 Glass 2 which he calls the anterior urethral control glass, is obtained in the same manner and its contents are from the same source. While obtaining Glass 1 it is advisable to massage the urethra upon the catheter in order to express the contents of any infected urethral follicles.

3. Glass 3 is obtained by having the patient pass about 50 ccm. of bladder urine. If the bladder is normal this glass will contain almost solely the contents of the posterior urethra, whose nature will be shown by the microscope as the products of posterior urethritis in uncomplicated cases, or of this lesion combined with drainage product from the prostate and vesicles in complicated cases.

4. Glass 4 obtained by cautious catheterization with a different catheter from that used in the irrigation of the anterior urethra, will show with a microscope that there is no pyuria, or that if present its origin is either vesical or renal.

5. Glass 5 is called the poststatic glass to obtain which there must be considerable urine left in the bladder or that organ must be distended with normal salt solution. The prostate is then massaged solely along the lateral borders of the lateral lobes where they form a distinct sulcus for the finger in the rectum between the prostate medially and the fascia of the pelvis outside it. Great care must be taken to avoid the middle of the prostate along the urethra where the course of the ejaculatory duct lies. After this massage the patient passes 150 ccm. of bladder content and this presents prostatic secretion normal or pathological foramina.

6 Glass 6 is the first seminal vesicle glass designated in accordance with the side from which it was taken. The author prefers to elect the vesicle which seems to be the least diseased on the ground that its contents may be far more normal, and he always begins with the normal vesicle if its fellow seems solitary in involvement. After massage of this organ, the patient must evacuate another 15 ccm., which will contain so purely the products of the diseased vesicle as to make the specimen of great clinical value.

7 Glass 7 or the second seminal vesicle glass, is obtained in similar manner by massage of the remaining seminal vesicle. In sterility the seven-glass test carried out in the usual manner will show whether or not both testicles are involved and whether or not there is atrophy of the two seminal vesicles.

The two-stage method consists in carrying the examination through Glass 6 in the ordinary way just described, and then postponing Glass 7 until a subsequent visit. The urine which at the first sitting was not massaged is now evacuated and the patient empties his bladder into one or two glasses, according to the call for a control specimen. This detail is extremely valuable where tuberculosis is suspected, and the contents of one vesicle must be carefully separated from those of its fellow.

The author illustrates the value of the seven-glass test with a chart of specimens obtained from numerous cases, and he also gives several case reports.

In conclusion, Pedersen says that this test is not infallible and no such claim is made, but no test possesses the quality of infallibility. It is not self-sufficient and the author does not so state but few tests are really self-sufficient not even the X-ray which commonly requires corroboration or is itself only corroborative. The seven glass test requires, first of all, digital skill in massage as such, and then with the parts of the prostate and seminal vesicles which are to be reached and with those part of the same organs which are to be voided during the massage which this test demands. It will be well for the beginner to study many patients personally before being satisfied with his own skill in the manipulation, and therefore convinced of his own deductions from the test. J. D. BARRY

Cameron D F: Variations in Renal Function
Dependent on Surgical Procedures *J Am
Med Ass* 19 6 1917 705

Cameron's work shows that in surgical diseases of the urinary tract the phenolsulphonphthal in test and the blood urea test are practically parallel although there is one type of case in which the phenolsulphonphthalin excretion is diminished but the blood urea is normal. He also shows that the relief of any type of urinary obstruction results markedly the percentage of phenolsulphonphthalin excretion accompanied by a drop in the blood urea. The most interesting portion of the article is the result of the determination of blood urea after operation with nitrous oxide-oxygen anaesthesia with rebreathing. These patients all show a decrease of the blood urea some of them just high. After operations under ether anaesthesia the increase in the blood urea if any was much less. Hence this small series of cases would fail to support the contention that nitrous oxide-oxygen ether anaesthesia has a less deleterious effect on renal efficiency than has a pure ether anaesthesia.

The author summarizes his results as follows:
The agreement between phenolsulphonphthalin and blood urea tests is as a rule very striking though not infrequently a low phenolsulphonphthalin excretion is associated with an unusually moderately increased blood urea concentration.
These tests are of great importance in selecting the most opportune time for operation so far as renal function is concerned.

Following an operation under a general anaesthetic there is, as a rule, an increase in blood urea concentration. This increase is most marked after operations on the urinary tract and especially on patients who already have diminished renal function. In a small series of cases the increase was slightly more marked following operations under gas oxygen-ether anaesthesia than following similar operations under ether.

Blood urea determinations are of great value in the diagnosis and prognosis of uremia. Not infrequently blood urea concentration can be determined when other renal function tests are very difficult or impossible to use.

In this investigation definite symptoms of uremia in uncomplicated cases appeared when the blood urea concentration reached 180 to 200.

There is a definite group of patients who have a low phenolsulphonphthalin excretion but a normal or approximately normal blood urea concentration. Many members of this group withstand a general anaesthetic without any complications due to renal insufficiency.

V D LLEVIN, MD

Pedersen V C: The Diagnosis of Ureteral Calculus
J Am Med Ass 19 6 1917 709

This method is not intended as a modification for or as a substitute of that described by Burton Harris but rather as an application of it to the Brown Buerger cystoscope. The method of preparing the

wax tip itself and the compound of wax and the same as those detailed by Harris likewise the technique of passing the wax tipped filiform into and coiling it within the bladder full of urine or of boric acid water artificially introduced. The sheath of the Brown Buerger instrument has a very well fitted trum which when passed along the filiform guide in the urethra chafes and even causes smart hemorrhage from the distal urethra in many cases. In order to avoid this the author has devised an obturator having a well fitted at the vesicel end and at the handle of the sheath through which the filiform guide is threaded. The obturator protects the mucosa and permits easy introduction of the instrument without pain or bleeding. The distending fluid in the bladder escapes through the slots of the obturator. The thin thickening telescope is passed through the distal urethra and the wax tip brought into view exactly as Harris describes rotated completely under the eye for demonstration of any scratch and then passed into the ureter. The author leaves the filiform again to the tone after rubbing it upon it and then withdraws the cystoscope and the filiform as one instrument. The distance from the eye piece to the wax tip is almost the exact distance of the stone from the mouth of the ureter. This method will be found direct simple and accurate and in adapting the Harris method to the Brown Buerger instrument the use of a Nitze instrument is unnecessary for which instrument Harris originally described his technique.

BLADDER, URETHRA, AND PENIS

Legueu F: Extraction of Bullets from the Bladder
by the Natural Route (Le trait par les
voies naturelles des balles de l'essai) *J d'rol*
9 6 1895

Fragments of shell or shrapnel balls on account of their irregular form and sometimes their large caliber must always be removed from the bladder by the operative method.

Rifle bullets on the contrary being smooth and of a sufficiently small caliber can be removed through the urethra. Legueu has thus removed all such bullets which he has found and considers it the method of choice.

To carry out this procedure it is necessary that the bullet be quite within the bladder free movable and have no concretions. Radiography in two different positions will generally determine some of these conditions but cystoscopy must be relied on. It alone shows without error the presence the situation and the mobility of the bullet and it alone can show all the conditions which it is necessary to know before proceeding to extraction.

Legueu's procedure is very simple. He uses No. 00 lithotrite which he has adapted for this purpose, and by touch alone performs the extraction. The instrument is introduced into the bladder by the urethra in the usual way just as if a stone were to be removed only that the bullet must be seized

either by the point or by the base, and not transversely. The dimensions of the urethra easily permit extraction. No anesthetic is necessary unless the bladder is extremely sensitive or the patient cannot stand the proceeding. W. A. BRENNAN

Turner, G. G. Foreign Bodies in the Bladder Resulting from Gunshot Wounds. *Lancet* Lond. 9 6 Dec, 1918.

The author cites three cases of wounded soldiers in the present European War in which the foreign body had presumably lodged in the bladder at the time of the casualty. In each instance there was some urinary trouble from the outset. The lodgment of a missile in the bladder is an event well recognized in all campaigns. In most museums there are specimens of calculi in which the nucleus is formed by some type of bullet. In the X-ray investigation of such cases plates should be made with the patient in various positions and with the bladder empty and distended. Marked alteration in the position of the shadow will then be a guide as to the freedom of the foreign body in the viscus. A routine cystoscopic examination ought also to be carried out, for there may be some non-metallic foreign body in addition to that shown by the X-rays, or the foreign body may be entirely non-metallic, and a negative X-ray examination is therefore not enough to establish the diagnosis.

It is interesting to observe how the wound in the bladder spontaneously closes. Small foreign bodies always tend to escape with the urine but those that cannot negotiate the urethra may sometimes be safely removed in the eye by an evacuating catheter. Leguen, using a specially modified lithotrite, has removed rifle and machine-gun bullets per urethram rapidly and without general anesthesia. For shrapnel bullets, large or ragged fragments of shell, or incriminated foreign bodies the author considers the suprapubic route the method of choice, and he believes it will certainly be the safest in the hands of those without special training. H. A. MOORE

Saviozzani, V. Treatment of Gunshot Wounds of the Bladder (Contributo alla terapia delle ferite d'arma da fuoco della vescica). *Clin. chir.* 9 6 Nov, 1918.

Saviozzani reports two cases of gunshot injuries of the bladder treated by suprapubic cystostomy and tamponade of the bladder opening with favorable result. In one of the cases there was found located in the bladder a bullet as well as some spiculae from the fractured innominate bone.

Gunshot wounds of the bladder are more frequent than any other kind of bladder wounds. Bartels collected 85 such cases but it is only very rarely that as in one of these cases, a bony fragment is carried into the bladder by the projectile. Bladder injuries of this kind are classed either as intra-extraperitoneal. In the intraperitoneal variety the prognosis according to most writers is absolutely

fatal. Although this prognostic conception seems rather exaggerated to the author yet in the statistics of 5 cases, collected by Rivington, of intraperitoneal cases there was no recovery nor was there a recovery in any of the cases reported by Bartels.

Extraperitoneal injuries have, however, a more favorable prognosis, but it is difficult to determine whether the injury is intra or extraperitoneal as the early symptoms in both are identical.

Regarding treatment the prime necessity is to arrest hemorrhage and assure the flow of urine. Some recommend the *sonde à demeure* in extraperitoneal injuries, others recommend suture of the bladder and laparotomy in either variety of injury.

As to the treatment adopted by the author, i. e., cystostomy with tamponade of the bladder (with laparotomy also in the first case) he thinks that the brilliant result obtained authorizes him to strongly recommend this procedure because it is rapid, safe, and in serious cases can even be carried out under local anesthesia. In these cases suture of the bladder was technically impossible and in gunshot wounds accompanied by a perivascular hemorrhage the difficulties of suturing are such as to favor the simpler and equally safe method adopted by him.

W. A. BRENNAN

Davis, E. G. Vesical Drainage: Historical Review and Presentation of a New Apparatus. *J. Am. M. A.* 9 6 1919, 680.

The author reviews the various forms of apparatus used for urinary drainage following suprapubic cystostomy. The ideal apparatus permits urinary leakage from the time of operation until the patient is healed requires little attention causes no inconvenience to the patient and is simple and inexpensive.

The author describes and illustrates the apparatus used in the James Buchanan Brady Urological Institute. Two bottles of 8- and 16-liter capacity rest on a stool on the floor beside the bed. The larger one is a vacuum, which is gradually decreased in strength by leakage of air through a minute capillary glass tube from the smaller bottle. When the smaller bottle the air pressure is slightly less than one atmosphere so that by virtue of this difference the urine is drawn out of the bladder through a catheter and tube into the smaller bottle. As the urine drops into this bottle, it replaces the air which has leaked into the vacuum of the larger bottle. The capillary tube is placed within the vacuum bottle to keep the apparatus as compact as possible.

The air pressure within the urine bottle is regulated by a small U-shaped manometer of glass tubing with a lumen of 3 mm. For the sake of convenience and safety this manometer is also placed inside the vacuum bottle. In the bend of this tube is a small amount of mercury which if sufficient pressure is exerted, will permit air to pass in either direction. This furnishes a safety valve which prevents the

pressure within the urine bottle from lifting from the atmospheric pressure by more than 20 mm. of mercury and also prevents the catheter from exerting more than the gentlest suction within the bladder.

The care of the apparatus is very simple. The urine bottle must be emptied when full and the air in the larger bottle exhausted at least every forty-eight hours. W. E. L.

Erkes, F. Manual Expression of the Bladder in a Spinal Injury. (Zur med. u. n. t. p. e. J. Blase bei Rueckenmarksläsionen. M. d. med. Wch. 18. 1910. 1. 5.)

In the case reported by Erkes there was a penetrating injury by a gunshot which traversed the spinal column. The entrance was at the fifth lumbar line and the outlet a little to the right of the spinal apophysis of the tenth lumbar vertebra. There was complete loss of sensation and motion in both lower limbs as well as bladder and rectal paralysis. To avoid catheterization the author practiced manual expression of the bladder through the abdominal wall which by this method is completely evacuated.

Laminectomy was done with extraction of the osseous fragments which compressed the dura mater. Later in the day the patient suddenly developed grave abdominal symptoms and died with symptoms of bladder rupture. At autopsy an ulcero-perforation of the fundus of the bladder was found.

The author thinks that manual expression of the bladder should only be made when there is no evidence of cystitis or any alteration of the vesical walls but that when this can be assured the method is capable of giving good results in selected cases. W. A. BREWER

Thomas, B. A. Total Cystectomy One and a Half Years After Operation. (Ibid. 1911. 1. 754.)

Thomas reports the case of a man of 41 in whom he found cystoscopically as the cause of excreting bladder-symptoms multiple variably sized small polypoid tumor formation completely covering the trigonum and vesical neck. Since various conservative operative measures including suprapubic incision, fulguration, suprapubic cystotomy with cauterization of the entire trigonum and vesical orifice had proved inadequate against the rapidly reforming polypi bilateral nephrectomy supplemented by total cystectomy eight months later was performed. A remarkably quick convalescence ensued. Four months later on account of recurrence of pain in the perineum and urethra suggestive of involvement of the prostatic urethra a radical perineal extracapsular prostatectomy and posterior urethrectomy were performed supplemented by deep implantation of 0.5 mg. of radium in the perineum for 48 hours.

The retrolumbar fistulae were fitted with silastic silver tubes connected with rubber tubing to a flat receptacle suspended over the suprapubic

region. The patient at present enjoys good health and has no difficulty in keeping himself dry.

The case reported by the author marks the first instance in which Watson's procedure suggested ten years ago was successfully accomplished alluring at the same time the practicability of the method as a satisfactory renal drainage apparatus. M. K. ROSENER.

Loumeau. Congenital Stricture of the Urethra. (Sem. t. n. é. de l'ur. 1912. 1. 134.)

Loumeau reports the details of three additional personal cases of congenital stricture of the urethra. The striking total number of case of this condition which has been considered rare reported personally by Loumeau within the last few years to twenty. W. A. BREWER

Shoemaker, G. E. Primary Carcinoma of the Urethra Retention of Urine from Obstruction Restoration of Function by Radium. (Ibid. 1913. 1. 13.)

The urethra has been called the rarest location for primary carcinoma. Most cases are merely extensions. In 1905 M. Murphy could find only 26 personal cases. Sielmann reports a case relieved by X-ray. Legeu and Chéron of Paris arrested the destructive process for two and a half years with radium.

In the author's case a multipara of 30 years applied because of complete urinary retention from urethral obstruction. There was no bleeding nor ulceration and no tumor. The urethra felt through the vagina like a hard fixed pencil-sized ridge extending from the retracted meatus backward nearly to the base of the bladder. The edges of the meatus were hard irregular nodular and ridge-like with but little enlargement or surrounding infiltration. As incontinence would have followed surgical removal radium was applied by the author in collaboration with Newcomet while bladder paralysis and cystitis from enormous distention were treated. After nine interurethral applications three hours each the patient was able to urinate normally. The urethra was still cordlike. Microscopical diagnosis quamous epithelioma. Wassermann test for syphilis was negative.

Rochet. Total Ischiopubic Disconnection of Deep Perineal Fascia in Order to Reach the Deep Urethra and Exteriorize the Prostatovesical Region. (Développement de la région périnéale et de la région prostatico-urétrale. L. 1910. 1. 134.)

Rochet refers to the varying procedures which surgeons have resorted to in order to find a relatively easy mode of access by the perineal route to the deep male genito-urinary organs. Young's perineal operation Boeckel's areolar operation of Folle's coccyperineal route as well as others are reviewed.

The author however finds all these methods limited and in seeking a method for reaching the deep perineal organs and bringing them completely out of the excavation has realized it by a massive mobilization of the whole deep perineum by lateral disconnection of the deep perineal fascia and its complete peripheral detachment from all the osseous ischio-subpubic triangle.

The operation is done in four stages. In the first the penis and scrotum being tightly drawn up a reversed V-perineal incision is made. The summit of the V corresponds to the subpubic angle and the sides of the V follow the ischio-pubic branches. This is practically Young's incision.

The second stage consists in the stripping of the deep urethra from the rectum as in an ordinary prostatectomy penetration into the recto-urethral triangle, section of the recto-urethral muscle, and separation of the anterior face of the rectum from the posterior face of the prostate.

In the third stage the membranous urethra is cut through immediately behind the bulb immediately before the deep perineal fascia. The anterior end of the urethra is slightly loosened up including the bulb and drawn away so as not to mask the field of operation.

The fourth part of the operation consists in an attack on the lateral attachments of the deep perineal fascia and on the deep perineum as far as the internal edge of ischium. This part of the procedure gives complete access and freedom of action on the prostate and lower portion of the bladder.

The author has carried out this operation in two cases of cancer of the prostate and he thinks the operation is indicated in cases requiring extirpation of the cancerous prostate, also when the lower part of the bladder is attacked by localized neoplasms. The high route of approach in such cases is difficult and the field is far from the reach of the finger and instruments.

W. A. BRENNAN

Thomas, B. A., Sitter, E. H., and Randall, A. Amputation of Penis for Carcinoma; Conditions Four and One-Half Years After Operation. *J. N. Surg. Phila.*, 9 6, 1911, 735

The case is reported of a man of 53 who in October 1901 had been operated upon for a typical carcinoma of the glans penis, involving the urethra, with metastasis to the inguinal lymph-glands on both sides and amputation of the penis close to the pubic arch.

Interesting features of the case are: Absence of recurrence, although complete extirpation of the penis with perineal urethrotomy was not done, and good functional result (ability to urinate in standing posture).

M. KROSTENKOV

GENITAL ORGANS

Gibbon J. H. The Treatment of Undescended Testicle. *Proc. M. J. Soc. 61st, 609.*

Because incomplete descent of the testicle is usually associated with a patulous condition of the

vaginal process, as in twenty-four of the author's twenty-seven cases, the congenital type of inguinal hernia, if not already present, is likely to develop. The undescended testicle is ever as large as the one that descends normally but contrary to the prevalent belief it is no more prone to malignant change.

An incompletely descended testicle in an infant can be drawn much lower down by regular daily efforts of an intelligent mother or nurse. The Boyan operation can be done at three or four years and by careful dissection the testicle almost invariably can be placed in the scrotum, but if not it should be returned to the abdomen rather than be excised.

The incision is the same as for hernia operation. The vaginal process is opened and divided transversely just above the testicle, the upper portion being treated as hernial sac and the lower portion is sutured round the testicle as a tunic. The lower portion of the sac is carefully separated from the surrounding structures and the spermatic cord is freely mobilized. This usually permits the testicle to be placed in the scrotum without tension but occasionally it may be necessary to ligate and divide the spermatic veins and artery. Owing to the free anastomosis between the spermatic artery and the artery of the vas, ligation of the former does not interfere with the circulation in the testicle. A pouch is next made in the scrotum by blunt dissection with the finger and the testicle with its tunica is placed therein. Retention sutures are not necessary except for a purse string which is loosely tied about the opening in the pouch. The inguinal canal is closed over the cord as in the Ferguson operation for hernia. In operations there were no deaths, no serious infections, and no post-operative disturbances of the testicle. In all 7 cases recently cured the testicle is painless, movable and in the position in which it was placed at operation.

J. B. CANNETT

Lavy. Treatment of Gunshot Wounds of Testicle (Zur Behandlung der Hodenverletzungen). *M. Wochenschr. u. B. u. Woch.* 9 6, 1911, 33

Testicular war wounds like other wounds of war are generally infected and with the patient under an anesthetic, the wound should be cleaned, washed and treated as an open wound. Infection is carried very easily into the serous cavity, but the most frequent and most serious complication in this class of injury is infection of the vaginal sac.

Lavy cites two cases one of which was due to mine explosion entailing lesions of both testicles treated with favorable outcome, following the technique recommended by Ritter, which consists in opening up the wound with a bistoury if necessary followed by lavage of the vaginal tissue, and suturing of the serous cavity.

W. A. BRENNAN

Raymond and H. Paratyphoid Orchitis Epididymitis (Orchitis-epididymitis paratyphoidique). *Bull. et mem. Soc. med. d. hop. d. Par.* 9 6, 1911, 551

The author gives the clinical details of a case in which there was a total disappearance of the right

testicle a small indurated stump alone remaining which appeared rather more epididymal than testicular.

Observations of such cases are still too few to give data for a clinical picture. However, in presence of the facts that are known it can be said contrary to the general opinion that these genital complications are far from being rare and that they are grave in general because they evolve with a tendency to suppuration and by destructive action cause testicular elimination. W. A. BRENNAN.

Del Valle, D. A New Operation for the Treatment of Varicocele. *Surg. (Ct.) Obst. Gyn.* 1914, 734.

The operations for the treatment of varicocele are numerous but none of them have fulfilled all that is required. Del Valle considers the following operation simple and the results better than those obtained by similar procedures.

1. Make an incision 5 cm. long on the external abdominal ring exposing to view the ring with its cord.

2. Dissect the anterior group of veins separating it from the other elements of the cord. It is not necessary to dissect the spermatic artery. In all varicoceles it is generally the anterior groups of veins forming part of the cord that is affected besides anatomically the anterior group has a greater number of veins and is more important than the posterior group.

3. Divide the anterior group into two subgroups anterior and posterior. Place a catgut ligature on the posterior subgroup one finger's breadth above the testicle and a silk ligature on the anterior one two fingers' breadth above the former on holding the thread.

4. Make an incision on the fascia of the external oblique within and parallel to the internal pillar of the inguinal canal introduce a forceps through the incision, directing it so as to come out at the orifice of the external abdominal ring seize the ends of the silk thread and pull through. Thus the entire anterior group of veins passes through the opening in the fascia and by means of a stitch it is fixed to it after ascertaining that the testicle has remained at the required height.

5. When the posterior group of veins is the one affected the operation is the same except that the opening in the fascia is made outside the external pillar of the inguinal canal and not within the internal pillar.

Louveau. Secondary Calculi of the Vesicoprostatic Region in Old Prostatitis (Les calculs de la région vésico-prostatique chez les anciens prostatitiques). *J. d. m. d. Bordeaux* 1916, txxvii, 35.

Where Frey's operation has been correctly executed there is often the ulterior appearance of calculi in the vesicoprostatic region owing to the existence above the prostate of an enormous cavity

into which the alkaline urinary salts are precipitated. The condition is not imputable to the surgeon but is a definite result of the prostatectomy.

Louveau thinks that prostatectomy should be followed up by disinfection of the bladder as long as the urine is not completely limpid and that the diverticular pocket of urining successive to prostatectomy should be suppressed by a perineal resection as this pocket is capable of permitting the formation of secondary and even primary calculi in situ.

In two cases in which Louveau observed secondary calculi subsequent to transvesical prostatectomy three times they were clearly attributable to post-operative prostatic cavities chargeable to the operation alone. W. A. BRENNAN.

Peterlin G. S. Calcareous Degeneration of the Prostate Gland. *Ann. Surg. Phila.* 1916, lxxiii, 68.

The patient 9 years of age sustained two trauma to the urethra by falls followed by copious purulent discharge from the urethra and symptoms of cystitis which continued for thirteen years, when a progressive enlargement and hardness were noted in the prostatic area. Palpation per rectum revealed a round smooth stony hard mass, the size of a medium sized orange. Cystoscopy showed general cystitis trabecular cavity with tenacious pus. The prostatic urethra showed phosphatic masses. The skilgraph revealed a large calcareous mass in the prostatic area which was removed through a suprapubic cystotomy. The mass weighed 31 grams. Ten days following operation the patient died suddenly from secondary hemorrhage. Autopsy was refused. I. S. KOLL.

Morton H. H. Suprapubic Prostatectomy. *Med. Times* 1916, xli, 150.

Morton describes two hypertrophic prostatic cases one 73 years old on whom a prostatectomy was done the other 84 years old upon whom suprapubic cystotomy was done for drainage as preparatory treatment for prostatectomy.

The first patient had led a catheter life for two years. This condition Morton designates as the third stage of hypertrophied prostates. Renal function tests had shown favorable results. Rectal examination demonstrated that the enlargement was high up in the pelvis and for this reason the suprapubic route was chosen. Hagner's bag was used to control hemorrhage instead of gauze packing formerly used by the author. Frey's drainage tube was now supplanted by one one-fourth its size in order to guard against a post-operative fistula. A lesser intake catheter was used occupying a considerable lower level than the outflow tube. A through and through silver wire suture was used in closing the wound.

The cystotomy case was done under stovain spinal anesthesia. Outcome of a bladder hemo-

rhage five years ago the patient had been free from trouble until the past few days when difficult urination occurred. For forty-eight hours retention was present, necessitating catheterization. Rectal examination found a middle lobe enlargement. A catheter was fixed in the bladder and continuous drainage allowed after a few days of gradual emptyings. However, the continuous drainage became faulty the patient slightly and toxicemic. On this account spinal anesthesia was selected instead of ether. Cystotomy was done and a jack-stone calculus removed. The prostate will be removed after the drainage has prepared the patient to withstand a prostatectomy.

Morton considers a low specific gravity (this case 1.015) with albumin, pus, and blood as prohibitive from either ether or even gas and oxygen anesthesia. He also considers cocaine unsatisfactory. Spinal anesthesia with atovaine 0.03 lactic acid 0.05 bolus alcohol 0.5 distilled water 9.95 cm is his preference.

The author cautions that the patient be slightly inverted after the spinal injection in order to keep the atovaine which is lighter in specific gravity than spinal fluid from leaving the lumbosacral region and thus prevent death from paralysis of the respiratory centers.

C. E. BAKER

Perrier, C. Transurethral Prostatectomy Under Local Anesthesia (La prostatectomie transurétrale sous anesthésie locale) *J d'ur* 9 6 vi, 509

Perrier reviews the various attempts which have been made to carry out prostatectomy under local or regional anesthesia. He points out that in most of these the method has necessarily to be more or less supplemented by a general anesthetic.

The author's method is a combination of these procedures which he avers has given him full satisfaction as typified in the five cases he reports. In detail the combined method is as follows:

1. Anesthesia of the bdominovesical wall by infiltration of 0.5 cc. of 1% adrenalin solution 1:200 the quantity used varying according to the stoutness of the subject.

2. Anesthesia by infiltration with the same solution of the bi-ischiatric line. This will allow of deep painless injections.

3. The left index-finger being introduced into the rectum, injection is made with long needles (10 to 15 cm.) under the prostatic capsule. According as the liquid is injected the capsule is felt to rise and extend.

4. Injection with similar needles of the sacral nerves with a solution 1:100.

Perrier is of the opinion that his cases show not only the harmlessness of the procedure but the pos-

sibility of applying it in cases which are most difficult from a technical point of view i.e. with very obese subjects where the prostate can only be exposed with much difficulty. Sloughing of the edges of the wound, as noted by Legueu has never been observed. In conclusion he thinks that a prostatectomy can be performed under local anesthesia with the same facility as a hernia or gall bladder operation.

W. A. BRENNAN

MISCELLANEOUS

Lydston, G. F. Sex-Gland Implantation *J Am M A* 9 1 540

The author gives an exhaustive summary of his previously published experimental work in sex-gland implantations with material taken from dead bodies and reports four additional cases of successful testicle implantations. In each case transplantation was made of the scrotum, testicle alone or of testis and epididymis from dead human bodies. One patient aged 45 has dementia precox and after the first operation also decided improvement. Another patient aged 29 a double implantation was done because of bilateral complete atrophy of the testes with restoration of virility and improvement in physical and mental vigor.

The author believes that the sex-gland hormone is the most powerful cell stimulant, nutrient and regenerative known to medical science and that sex-gland implantation preserves hormone production for prolonged periods. There is good reason to believe that physiologic and therapeutic advantages may be permanent. In none of the cases thus far observed has the implanted gland disappeared prior to twelve or eighteen months. The implantation may be repeated.

J. B. C. SMITH

Loumeau, Diabetes and Prostatectomy (Diabète et prostatectomie) *J d'ur* 9 6 vii, 35

Loumeau relates the case of a prostatic of over 70 who for the past three or four years had shown glycosuria which at the time of the examination amounted to 60 grams in twenty-four hours.

A two-stage prostatectomy was done with most excellent results and was followed by restoration of sexual and physical functions. In this case the diabetes which was of rheumatic origin had a permanent result on the prostatectomy which as a matter of fact cured the glycosuria.

Loumeau therefore thinks that contrary to the general opinion diabetes except in very severe forms is not an operative contra-indication.

W. A. BRENNAN

SURGERY OF THE EYE AND EAR

EYE

Stevens, H. W. The Clinical Significance of Radiographs of the Orbital Region. *Am. J. Roent. & Elect. Diag.* p. 106 v. 411

The author endeavors to show the value of making radiograms of the head in atypical positions. He especially presents positions to show the orbital region citing four cases in which the diagnosis could not have been made either by the stereoscopic lateral or anteroposterior plates.

Before using these new positions in attempting diagnosis he carried out a number of experiments in which he placed a metal object over the various lines of the anterior fossa and also covered some of the projections with lead foil. In this way he demonstrated that the interpretations by Rhese of certain markings were incorrect.

Owing to the asymmetry of the individual skull and the wide variation in the skulls of different individuals it is impossible to lay down a particular or definite procedure. Each case calls for a slightly different position of the skull on the plate. The author emphasizes the value of taking radiographs of both sides of the individual skull for comparison.

The usual position in obtaining plates for the proper study of the orbital region as stated by the author is as follows: The plate is so adjusted to the face that one edge rests upon the zygoma of the side under examination and the other upon the ridge of the nose.

The conditions demonstrated by this method of examination were as follows:

In the first case a lymphosarcoma of the orbit the change demonstrated by the plate was an increase in the size of the nasura orbitalis.

In the second case a new growth had caused the absorption of the crista galli and lamina cribrosa a condition which could not be demonstrated by the usual lateral plate.

In the third case there was a fracture of the floor of the anterior fossa, and finally a hemorrhage into the orbit.

W. A. EVANS.

Bourgeois, H. Twelve Observations of Orbital and Peri-orbital Fistulae (Douze observations de fistules orbitaires et péri-orbitaires). *P. S. Méd.* 916 xlii 5

The author reports on twelve cases of fistulae in the orbital region of which several were consecutive to war injuries. These were accompanied by lesions of the adneural cavities of the nasal fossae and sinuses. In the presence of such a fistula a tertiary fistulized ostium must always be thought of. Foreign bodies of small dimension or even small osseous fragments

suffice to cause these suppurations. Large opening must be instituted and the offending body searched out by the finger aiding the eye.

The ostium will be cured only when the healthy osseous tissue is reached. It is not less important to effect osseous reparation while avoiding secondary infection. This is best effected by leaving the osseous wound alone and suturing the operative wound as early as possible allowing only sufficient opening for drainage.

W. A. BERNARD.

Rhodes, G. B. Pulsating Exophthalmos. *Ann. N. Y. Acad. Sci.* 1961 389

In 1906 de Schweinitz and Holloway reviewed the reported cases of pulsating exophthalmos prior to that time. Since then the author has been able to collect 52 cases from the literature and to these he adds one of his own.

From a study of this series of 53 cases it appears that 3 of them were of traumatic origin and occurred spontaneously while in the cause was not given. In the traumatic cases there was usually a latent period of about 21 days before the first symptom the bruit appeared. The average age of the patients was thirty-six. Exophthalmos occurred at later periods varying from a few days to a month after the appearance of the bruit. Pulsation is a later symptom usually appearing within a few days after the exophthalmos has been noticed. Loss of the pupillary reflex with persistent dilatation of the pupil occurred in many cases due to the laceration of the carotid plexus of the sympathetic. Almost all cases showed an increase in the ocular tension but only two developed an absolute glaucoma. Diplopia, hemorrhages or edema of the retina, tortuosity and dilatation of the retinal veins were encountered with great frequency. Certain nerve lesions such as optic nerve atrophy, paralysis of the motor mechanism of the eyeball due to laceration or pressure on the individual nerves were commonly noted.

In these 53 cases practically all known procedures were employed with the exception of electrocoagulation. The author has given an outline of each of these cases with the operation and result and from them and the other cases previously reported in the literature it seems that ligation of the common carotid is by far the safest operation. In cases in which this fails one should be guided by the condition of the optic nerve as to further operative procedures. As cures have resulted after long periods if the nerve is not entirely gone and seems to be that it ended the orbital operation commonly known as Sattler's in which the superior ophthalmic vein is ligated should be attempted. This operation

while yielding good results, exposes the patient to the danger from hemorrhage in some cases.

I the author a case, ligation of the common carotid was followed by a complete cure, although the exophthalmos disappeared very slowly and was noticeable for more than four months after the operation. GATKHOON.

EAR

Read J S. The Necessity for Early Diagnosis and Continuous Treatment in Congenital Syphilis. *A. Ch. Polist.* 9 6 xxxiii 44.

The author concludes that the majority of these congenital cases are not receiving the full benefit of modern methods of diagnosis and therapy. The children of parents known to have or to have had syphilis should be considered to be until proved otherwise. If on clinical signs are apparent blood examination should be regularly made. If there is a suspicion of a taint in the child and the serum is negative the parents should be Wassermannized, and if tests are negative the child should be treated and again tested for often after a small amount of treatment a positive reaction will appear. If there is in the parents any history of chancres many years back, a provocative injection of salvarsan or mercury should be given and often a negative serum will read positive at the next test.

The author draws attention to the various symptoms which in an unsuspected case should arrest the attention and call for a differential diagnosis excluding the presence of syphilis: marasmus in a breast-fed baby showing no signs of indigestion; extensive peeling of the palms and soles a few weeks after birth; ouychia; a thinning of the eye brows in an infant a few months old; alopecia and any eye lesions in the very young; an unexplainable nephritis; a peroxymal hemoglobinuria; a hard swollen testicle occurring under one year of age; epiphyseitis within the first three months.

As to treatment, the same persistently selected application of salvarsan, mercury, K. I. and tonics are recommended as in adults, and the treatment should not be discontinued as soon as symptoms disappear but the course should be guided by clinical signs, serologic and other tests. OTTO M. ROTT.

Combes, G. M., and Erner, M. S. Vaccin Treatment of Chronic Suppurative Otitis Media. *Penn. M. J.* 9 6 xiv, 585.

The authors of this paper discuss the vaccine treatment of chronic running ears and report the results of a series of 50 cases treated with utoge-

nous vaccines of their own preparation, the results of complement fixation tests in 10 of the cases.

Wassermann reactions, and 15 von Pirquet's. All of the 50 cases observed were inveterately chronic in type. The result obtained was 46 per cent of dry ears up to the time of writing the paper, which was several months after the last case had become dry. Great stress is laid upon the technique of culture taking for vaccine preparation and place made for close co-operation between the clinic and laboratory. The technique used was to cleanse the middle ear and canal as thoroughly as possible with cotton swabs or by suction, fill the canal with alcohol for ten minutes, remove and dry by evaporation for fifteen minutes. Then by inflation or by suction, a drop of pus was obtained on a sterile platinum loop inserted through sterile speculum. Sometimes no growth was obtained evidently from too complete sterilization.

The authors believe that vaccine therapy will permanently stop the discharge in a good many of these chronic cases. Those showing much bony necrosis, especially in the mastoid, cholesteatoma and possibly labyrinth suppuration would probably not yield good results. They advise neglecting nothing in the way of local treatment of the ear, nose, and throat that may be indicated but that vaccine should be given in connection with all other accepted methods of treatment.

The reasons for failure to obtain dry ears are suggested as follows: (1) Failure to obtain causative organism. (2) Necessary continued inoculation. (3) Spontaneous recovery. (4) Course of preparation. (5) Incorrect dosage. (6) Possibly low antigenic powers of the organism and the contra-indications mentioned above.

A solution of the question of determining the causative organism was attempted and complement fixations done, all of which negative result was obtained. The antigens used were polyvalent strains of several of the ordinary pus-producing micro-organisms. In these same cases Wassermanns were all negative and of 5 von Pirquet's, 3 were faintly positive and 4 strongly positive without local evidence of tuberculosis in the ear.

In regard to complement fixations, the authors conclude either that (1) it is possible that only a few free amoebocytes are circulating in the blood in these cases. (2) Bacteria in discharging ears are too thick to stimulate antibody production. (3) A lowered body vitality may antagonize response to infection. (4) The reaction may be so well walled off that absorption cannot take place. (5) The technique used may not have been delicate enough.

SURGERY OF THE NOSE, THROAT AND MOUTH

NOSE

Dean L. W.: *The Control of Haemorrhage in More Extensive Operations on the Nose and Jaws*
Laryngoscope 19 6 xvi 9 3

Before performing a major operation about the nose, throat and jaws the author usually ligatures one or more vessels in the neck, then early in the operation the smaller peripheral vessels are seized with hemostats. Usually some time later in the operation it is necessary to use pressure with water etc. to control hemorrhage by seepage.

In removing a superior maxilla, half an inch where it is necessary to invade the palatal or tonsillar region, the author advises the performance of a tracheotomy and packing the pharynx, the tube being removed just as the operation is completed. An abundance of hot water and a large electric cautery should always be at hand for the control of deep hemorrhage and for seepage.

The most essential condition in the control of hemorrhage in major operations is to have a corps of assistants who have been associated with the operator in numerous operations so that everything for the control of hemorrhage is done promptly and with precision.

The author has had no experience with the ligation of the large vessels on the side of the neck. The ligation on one side has, with the exception of one case, proved satisfactory. (1911) M. R. R.

Thomson S.: *Malignant Disease of the Nose or Accessory Sinuses. Advantages of Operating Through the Face.* *Lancet* 1906 98.

The author makes a plea for the performance of the Moure operation or lateral rhinotomy for malignant tumors originating in the antrunasal wall, the roof of the nose, in the antrum or in the sphenoid. The advantages claimed for this procedure are:

1. In all cases there is no mutilation or disfigurement.
2. Patients will readily consent to the operation.
3. They are left with an intact roof to the mouth and no troublesome obturator is required as in the old operation of excision of the upper jaw.
4. It is much easier after a Moure operation to keep a direct lookout in the nose and its accessory cavities for any suspicion of recurrence.
5. Recurrences are more easily dealt with either through the nasal orifice or by repeating the lateral rhinotomy, and patients are less likely to object to this than to a further facial disfigurement.
6. It can be extended to meet the special conditions met with or may be combined with other operative steps, for instance if it is found that the

dissemination has deeply invaded the orbit this cavity can be cleared out through the same incision, preserving the lower eyelid, sacrificing the eye if necessary. The nasal septum can be removed if the growth has attacked it. The antrum might be further cleared out by an incision through the canine fossa, but the access to the antrum obtained by a Moure operation cannot be improved upon. This may also be combined with the Denker operation. If the floor of the nose is found to be invaded the addition of a Rouge operation can be made.

Externally the scar within a few months is so slight as to be almost invisible.

8. Hemorrhage can be well controlled.

9. The front wall of the sphenoid is brought so well into the field that it is hardly one inch from the surface.

The author describes the technique of the operation and reports two cases in which the Moure operation was performed.

In the first case, endothelioma of the ethmoid and antrum, there was no recurrence after five and one half years.

In the second case, epithelioma of the left maxillary antrum, there was no recurrence after three and one half years.

These cases demonstrated the following facts:

1. Both an endothelioma and a carcinoma in the nasal area are susceptible of satisfactory treatment by this method.

2. A history of some standing or exteriorization of the growth does not necessarily invalidate the good results.

3. Dangerous difficult and disfiguring operations which were formerly tried can be superseded by modern methods which in the hands of experts are easier, safer, cause no disfigurement and promise a lasting cure. (1911) M. R. R.

Veasey C. A.: *The Diagnosis and Treatment of Inflammatory Affections of the Nasal Accessory Sinuses.* *J. Ophth. & Oto-Laryng.* 1906 9 6.

After alluding to the importance of sinus disease as a causative factor in many gastro-intestinal affections, as well as toxæmias affecting other portions of the body, the author considers the sinuses collectively and mentions the well known symptoms of headache, tenderness, nasal obstruction and discharge, dizziness and vertigo, as well as apoplexia and neuroathenic symptoms in general.

As to diagnostic methods, the author mentions transillumination as one of the best methods of assisting in the diagnosis. Other aids, as the pharyngoscope, X-ray picture and irrigating tube, are

trum, and the application of sucll to the nose are favorably commented upon.

As to treatment of the acute condition, the author mentions the necessity of securing adequate drainage and ventilation, and this is secured by shrinking the nasal mucosa by the application of a weak solution of cocaine. Instead of adrenalin, as the latter is apt to produce secondary swollen condition greater than was previously present. After the membrane has been shrunk the author cleanses it with a normal salt solution with mild alkaline solution followed by an application of a 5 per cent solution of argyrol and an oil spray. The patient is instructed to douche his nose freely with hot normal saline solution every hour or two and to take deep inhalations every two or three hours of compound tincture of benzoin and menthol four ounces of the former and one drachm of the latter of which two tablespoonfuls are employed in one-half pint of boiling water. General treatment with calomel, saline, aspirin, and phenacetin is recommended.

The indication for the treatment of the chronic cases is likewise, drainage, whether obtained by the correction of obstructing septal deformities or hypertrophied turbinates. After drainage has been obtained irrigations are advised, and when these prove futile, operative interference is justified. Not much faith is held by the author in the beneficial influence of autogenous vaccines. Otto M. Rott

Berry J M. Radiography in the Diagnosis of Diseases of the Accessory Nasal Sinuses.
Arch. Radiol. & Electrol. 9 6 1914.

In radiographing the sinuses of the head the author makes use of the following positions: (1) postero-anterior view (2) lateral view (3) oblique view and (4) vertical view.

In the majority of cases the postero-anterior and lateral views alone will give the information desired. The other views elucidate special points not made clear in the postero-anterior and lateral views. Stereoscopic pairs in postero-anterior and lateral positions often give additional information.

The oblique view is made by first placing the patient and tube in the usual position for making postero-anterior view and then displacing the tube laterally about two inches. This projects the sphenoid sinus to one side of the nose, displaces the petrous portion of the temporal bone clear of the antrum on one side, and brings the ethmoid of one side into fuller view. By making a second exposure with the tube displaced to the opposite side, comparison of the two sides may be made.

The vertical view is made by placing the patient chin over the edge of a table, the tube being placed above the vertex. This view shows the sphenoid sinuses side by side.

Examination of the frontal sinuses reveals their extent laterally and vertically and the depth teroposteriorly. The thickness of their walls is also manifest and their accessibility through the nose. The presence and location of septa are

determined. These are important factors if a drainage operation is contemplated. The presence of air-cells in the crista galli has a bearing on the possibility of meningeal infection from the frontal or ethmoid sinuses. The determination of the thickness of the walls of the frontal sinus is important for these reasons:

1. A thin posterior wall favors the spread of infection to the meninges.
2. A thin floor favors the spread of infection to the contents of the orbit.
3. A thick anterior wall may make operation very difficult or lead the surgeon to think the sinuses are absent.

Examination of the ethmoid cells gives information as to their size, the total area covered by them, and their relationship to the other accessory sinuses.

The latter point is important in considering the likelihood of infection spreading from one sinus to another.

Radiography of the maxillary sinuses demonstrates the following points: (1) the size (2) relation to other sinuses (3) projection of tooth roots through the floor and (4) presence or absence of an alveolar recess.

The third point is important as a likely avenue of infection in dental caries, the fourth must be considered when drainage operations are contemplated.

The facts to be determined in radiography of the sphenoid sinus are its size, the thickness of its walls, and its relationship to the sella turcica and the optic chiasm.

The two latter points are very important in case the chief danger—suppuration of the sinus—re extension to the meninges, to the optic nerve or thrombosis to the intracranial venous sinuses. Since the optic chiasm is often in direct relationship to the roof of the sphenoid sinus, the thickness of the bony wall is a very important factor in determining the likelihood of implication of the optic nerve in sphenoid infections. G. W. Gair.

Arrowsmith H. Malignant Hypernephroma of the Ethmoidal Region. *Laryngoscope* 9 6 1914.

The author reports the case of a colored male, 56 years of age, with history of obstructed left nostril and repeated attacks of profuse bleeding from that side. The mass was removed by snare.

Very profuse hemorrhage ensuing necessitating tamponing. A few days later the patient went home. The pathologist's report revealing the true nature of the growth, the patient was sent for and he reported that he had suffered several profuse attacks of hemorrhage while at home.

Physical examination revealed a distinct mass in the right upper abdominal quadrant and enlargement of a number of superficial glands in that region, many disseminated areas of consolidation in both lungs, a right suprascapular mass the size of hen's egg. For the next few weeks there was profuse bleeding. The left nostril was again

filled with a mass and a complete extirpation was decided upon. The left external carotid was ligated and the right supraclavicular mass removed. The nostril was exposed by a lateral rhinotomy after Moutre's method and a friable yellowish mass was removed which had involved and destroyed the entire left ethmoid region and the inner wall of the orbit. Bleeding was profuse and the patient died three hours after leaving the operating room.

The author states that this is the only case in which the nose was involved in a metastatic growth of hypernephroma although metastatic involvement of the larynx (one case by Menzel) and of tongue (one case by Coenen) are mentioned.

OTT, M. R. II

THROAT

French, T. R. The Tonsilloscope. *N. Y. M. J.* 916 611, 661

The instruments needed for internal tonsilloscopy or the examination of the tonsil *in situ* are a lens tube speculum or tonsil microscope and a slender lamp which can be placed behind, below or above the tonsil and buried within the various spaces between the tissues so that its light is not directly exposed to the eye. The tonsil microscope which is made in two sizes is a slender tube or speculum about six inches long inside of which at the end of a sliding tube is a lens of from five to eight diopters according to the visual needs of the examiner. The distal end of the microscope is beveled and shaded and has an aperture the diameter of which is in one instrument one-quarter of an inch and in the other one-eighth by one quarter of an inch. The instrument with the largest aperture is intended for the examination of the free face of the tonsil and the capsule as well. That with the smaller aperture is intended for the examination of the capsule only.

The lamp is of one candle power and is enclosed in a small metal case with a glass window at or near its distal extremity. It is attached at an obtuse angle to an electric light shank which connects by a cable with a tungsten battery balanced in size and power to the candle power of the lamp. The tonsillar substance can however be more effectively transilluminated with a double lamp which should be preferred in all examination in which the tonsil is large enough to hide the glass windows from view.

By this method of transilluminating the tonsil lights up in much the same way as does a stained glass window brilliantly transilluminated from the opposite side. The outlet of the tonsil microscope is then applied to any and every surface of the luminous tonsil not occupied by the lamp including a large part of the surface of the capsule even if there are no adhesions to the anterior pillar. Many of the conditions within the tonsil can in this way be seen directly. The meaning of the varieties and shades of coloring is a matter of interpretation

which has been developed from experimental color studies made in association with the anatomical histological and pathological findings.

When the tonsil is that of health or nearly so it is relatively translucent and permits a considerable amount of light into its contents. When however it is the seat of disease it is less translucent in proportion presumably to the number and virulence of the bacteria in the pathogenic material present and the consequent inflammatory reaction produced by them so that in extensive disease it is impossible to detect anything beyond collections of detritus and pus lying close to the surface.

Another instrument which the author calls the external tonsilloscope is used for the examination of exploratory sections removed from the tonsil at the beginning of operations and for the study of the tonsil as a whole or in part after operations. It consists of a simple microscope on a light screen and a powerful electric lamp suspended together from a crane. The object in their suspension is to make it possible to conduct the examination without a break in surgical cleanliness. The lens in the microscope has a magnifying power of six diameters. It is fitted into the proximal end of the tube of the microscope and has an adjustable focus. The microscope tube tapers to a size at the distal end which can be readily covered by a section or the whole of the tonsil. The specimen is caught upon a hook at the distal end and left in position for leisurely study. The lamp is the Nernst of 350 candle power.

The former procedure internal tonsilloscopy is of more practical significance.

The following classification of the conditions found in the tonsils is offered:

- 1 The tonsil of health
- 2 Functional stimulation or mild disease the doubtful class
- 3 Superficial abscesses
- 4 Apparently acute or large foci of detritus and pus occupying restricted areas.
- 5 Considerable general disease
- 6 Extensive general disease

The picture of the tonsils as seen through the microscope in the above classifications are then given as follows:

1 The color of a tonsil in health is warm amber but the passage of light through a thin edge of a tonsil or through a very small tonsil of health even in an adult produces a color more like that of rock candy. In the tonsil microscope small arteries are seen coursing upon the surface and to some extent in the stroma while here and there in the substance of the gland appear small round red spots like flies in amber.

2 In the doubtful class functional stimulation or mild disease there is a departure from the normal indicated either by a uniform pink-amber color or by involving the entire tonsil or by hyperemic blushes covering small areas of the amber field.

3 In the class, superficial abscesses, blind ab-

abscesses are seen just under or near the epithelium on the free face of the tonsil which transilluminate as dark or black discs according to their proximity to the surface the nearer the surface the darker the shade. In the tonsil microscope abscess formations when present may also be found directly under the capsule.

4. The class characterized by apparently active or large foci of detritus and pus occupying restricted areas. The prominent feature found upon examination of this group, with the tonsil microscope and transillumination is that the hyperemia is in more or less sharply defined areas set in a field which may not be far removed from the color of the tonsil in health.

5. In the fifth class in which there is considerable general disease there is uniform though comparatively light hyperemia indicating that there is quite a number of collections of detritus scattered throughout the tonsil, but probably no pus.

6. The sixth class is marked by extensive general disease, which implies the honeycombing of the crypts and the substance of the tonsils with detritus and pus. The coloring in transillumination is uniform and of the deepest shade seen in the tonsils, and always corresponds to that of the anterior pillar.

The following conclusions have been offered as a result of a study of 666 tonsils in and from 333 operations upon children and the study of tonsils *in situ* in a large number of youths and adults.

1. All enlarged tonsils in subjects above the age of eight years are diseased.

2. Enlarged tonsils in subjects below the age of eight years may or may not be diseased, and whether they are or not can be determined only by examination with the tonsilloscope.

3. The tonsils in subjects above the age of childhood are often, and without much doubt oftener than we now know, the seats of foci capable under certain conditions of producing local and systemic infections.

4. In many subjects with tonsils in classes 2, 3, and 5 it has been proven that they are the source of systemic infection, and total excision holds out the only hope of complete and permanent relief.

5. Tonsils which are the seat of extreme disease and which are, therefore, seen to be excessively hyperemic, bleed freely when cut into.

6. The inner wall of a peritonsillar abscess can be located and mapped out with ease.

OTTO M. RORT

Adams, E. Sarcoma of the Tonsil. *Am Med* 9 6 21, 320

The case reported is that of a woman aged 53 who had a small ulceration about the size of a dime on the left tonsil. The tonsil was movable but the cervical glands anterior to the sternomastoid muscle were enlarged. The clinical diagnosis of sarcoma was made and the high-frequency current was applied daily both to the tonsil locally and externally to the glands but with no effect. At the same

time Coley's serum was used the injections having been made in the gluteal region, subcutaneously. The dose at first was one minium but it was pushed to 15 minims when the patient had a severe reaction. There was no influence on the growth, however consequently radium therapy was used, but the only result was severe radium burn. The tonsil then was removed by means of a snare and examined microscopically when a diagnosis of round cell sarcoma was made.

Radium was again used but in spite of this the glands in the neck and axilla increased and later there was evidence of pulmonary metastasis with sudden death evidently from pulmonary embolism. (OTTO M. RORT)

Kenyon, E. L. and Kradwell W. T. A Study of the Physicochemical Function of the Palatal Tonsil. *Ill Med J* 9 6 120, 426.

The authors study resulted in the following conclusions:

1. The tonsil serves as an absolutely necessary factor in providing a barrier for the action of the palatoglossus muscle.

2. The function of the tonsil with reference to the palatopharyngeus is to afford support and protection of great importance to its normalcy of action.

3. Tonsillectomy serves to destroy not merely possible lymphatic function of the tonsil but also to either disturb or destroy an important physicochemical function, on which is capable of being clearly demonstrated.

4. More or less impairment of the action of the depressor palatal muscles must occur in practically all cases following tonsillectomy regardless of the delicacy of operative technique or the particular form of operative procedure adopted but delicacy of procedure and method of operation are not of course to be considered unimportant.

5. To consider the present operation of tonsillectomy as a final settlement of the operative approach to the tonsil is premature and erroneous. The whole tonsil question requires further anatomical, pathological, and operative study in order if possible to readjust the operative approach to the organ to the new knowledge which is accumulating.

OTTO M. RORT

Farrington P. M. Tonsillectomy According to the Sluder Technique. *South Med J* 9 6 1, 456

The author regards properly performed Sluder operation as the simplest, safest and best method of performing tonsillectomy. He regards tonsillectomy as a hospital procedure to be performed in the morning after the patient has been thoroughly examined by an internist and properly prepared for general anesthesia.

With the patient on his back, under ether anesthesia the operator removes the tonsil with the Sluder instrument and fills the tonsillar fossa with a gauze pad. After inspection of the tonsil to see if it is intact, he removes the gauze sponge, inspects

the fossa stops all bleeding with clamps which he allows to remain on for a minute and proceeds with the other tonsil. In a series of 175 cases operated upon by this method the author had only 5 failures all of whom were adults.

ELLIOT J. PETERSEN

Dupuy H.: A Study of Five Hundred Tonsillectomies with the Beck Pierce Tonsillectome. *South M J* 1906 453

The author claims many advantages for tonsillectomy performed with the Beck Pierce tonsillectome basing his opinion on data obtained in five hundred consecutive cases operated upon with this instrument by a modified Sluder technique. Among the advantages he claims that enucleation can be quickly performed, danger of hemorrhage is minimized, there is less traumatism and local reaction than by other methods, though he admits these advantages are obtained in operations on children under the age of ten years and that this method is not ideal in operating upon adults.

As to the technique the tonsil is lifted upward into the supratonsillar region and gently pushed through the ring of the tonsillectome with the index finger. The mass is then seized with a grasping forceps meanwhile keeping the index finger against the tonsil and the wire loop slowly drawn thus enucleating the tonsil with a thin layer of capsule and leaving the greater part of the capsule in the fossa as a protective lining.

ELLEN J. PATTERSON

Escalada C. Fractures of the Larynx (fracturas de la laringe). *P. med. y g. t.* 1906 43

The author has made an elaborate study of laryngeal fractures. In some cases the mechanism of a laryngeal fracture is evident and does not call for discussion. In others however the clinical manifestations admit of different interpretations. Escalada has made six series of experiments on the cadaver using anteroposterior pressure upon the thyroid, the cricoid, and the laryngeal conjunctive then repeating this series using transverse pressure. He found in general that a pressure of 55 to 80 kilograms was necessary to fracture the larynx but that the force varied with the age of the subject and the degree of ossification.

In a case of fractured larynx the treatment in general will be confined to prevention of asphyxiation pending intervention by a specialist. Tracheotomy is recommended for the prevention of recurrence of asphyxia but some recommend this as a precautionary procedure to obviate the accidents which might occur.

W. A. BRENNAN

MOUTH

Merritt A. H.: The Roentgen Ray in Dental Practice. *Am J Roentgenol* 9 6 311 364

The author discusses the use of the roentgen ray in the following conditions: (1) periapical infections, (2) pyorrhea alveolaris, (3) missing and impacted teeth, (4) facial neuralgia.

1. Periapical infection. When a tooth loses its vitality it is only a question of time when it becomes infected. The acuteness or chronicity of the symptoms of this infection depend upon the number and virulence of the organisms engaged. If the infection lapses into the chronic state the pain subsides and the patient is usually unconscious of its presence. A discharging sinus may be present or a blind abscess may surround the root of the tooth. Differentiation between these two conditions cannot be made by the roentgen ray nor is the severity of the infection disclosed by roentgen examination. Every non vital tooth should have the pulp removed, the root canal sterilized and filled to the end in order to prevent trouble which is certain to come unless this is done. If abscess is already present in addition to this the abscess should be opened through the alveolar process, curetted, packed with sterile gauze and allowed to heal from the bottom. If the end of a root extends into the cavity it should be amputated. Teeth treated in this manner are not a menace to health and should not be indiscriminately extracted. Where extraction is necessary it is advisable to first procure cultures for autogenous vaccines as the secondary constitutional symptoms do not always clear up with the removal of the exciting cause.

2. Pyorrhea alveolaris. The amount of destruction of bone in this condition is not always correctly shown by roentgen examination. If the necrosis occurs on the labial or lingual surfaces of the tooth it will not be visible on the roentgenogram. If it occurs on the lateral surfaces only the condition may appear to be worse than it really is.

3. In missing or impacted teeth the roentgen ray is indispensable not only to demonstrate the presence or absence but also the relative position of the teeth in question.

4. Facial neuralgia. If this trouble is caused by pulp nodules, or by enlargement of teeth roots (hypercementosis) the roentgen ray is of great diagnostic value. The author lays great stress on the fact that it is seldom necessary to ray the entire mouth if proper inspection is made previously. Pyorrhea is easily identified while periapical infections always occur in non vital teeth. The only thing then left to ray are malposed teeth which are usually molars.

G. W. CRIER

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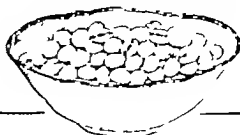
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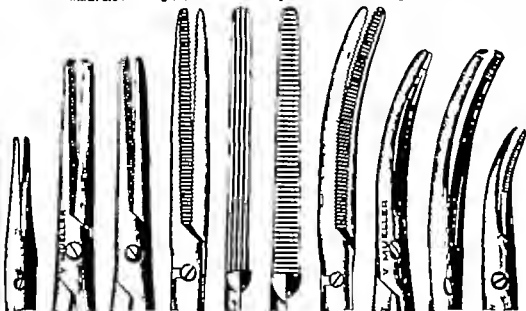
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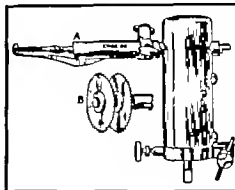
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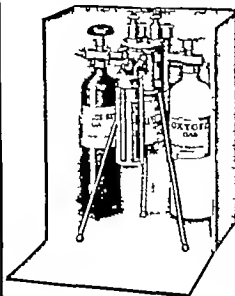
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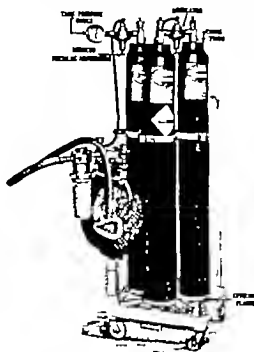
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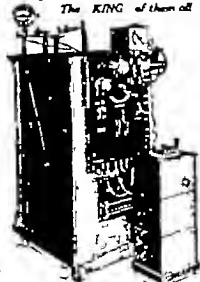
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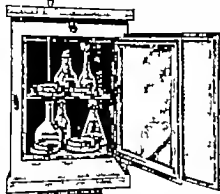
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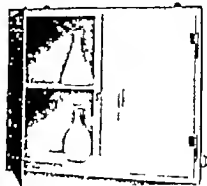
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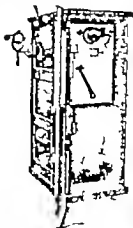
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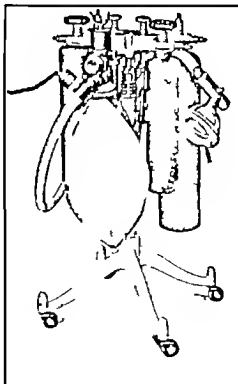
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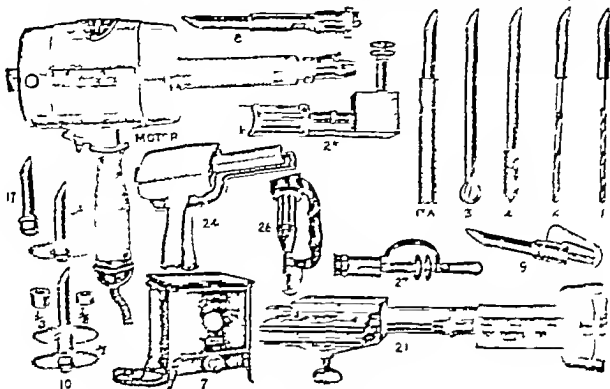
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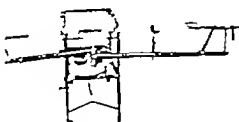
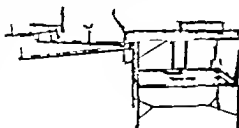
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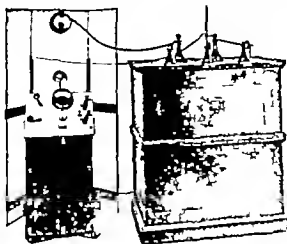
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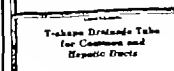
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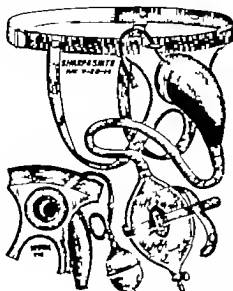
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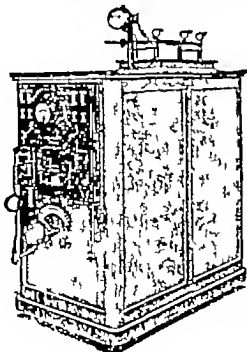
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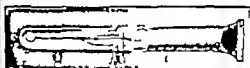
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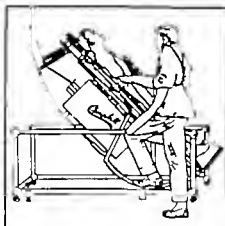


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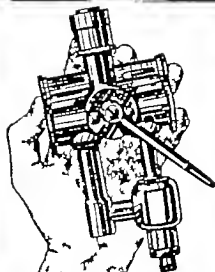
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Plate I, Men's Belt

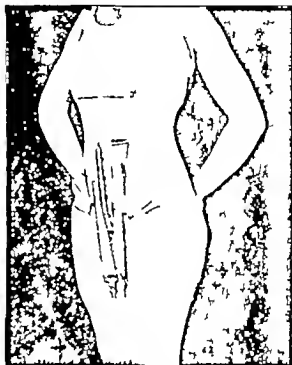


Plate II, Women's Belt

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 Puerperal Gangrene of the Extremities ARTHUR STEIN, M.D. New York
 An Uncomplicated and Convenient Intestinal Anastomosis Clamp JOSEPH RILEY EASTMAN, M.D. Indianapolis
 Perforation in Typhoid Fever with Report of a Case Associated with Acute Typhoid Appendicitis in a Child of Seven Recovery DAVID H. EDDY, M.D. Chicago
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Fig. 5 Ligation of splenic pedicle. (Donald C. Balfour)

SURGERY, GYNECOLOGY AND OBSTETRICS

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THE TECHNIQUE OF SPLENECTOMY

BY DONALD C. BALFOUR, M.D., FACS, RICHMOND, MINNESOTA

THE more frequent recognition of certain chronic disorders of the blood particularly plenic anemia hæmolytic jaundice and pernicious anemia and the therapeutic value of splenectomy in these and other diseases have recently greatly extended the indication for splenectomy and suggested some observations on the technique of the operation. In our experience (especially in those cases in which technical difficulties are encountered) the operation has been facilitated by following a routine plan and by the precision with which the detail of such a plan are carried out.

Through a left Bevan incision (Fig. 1) its length depending on the size of the spleen the abdomen is explored. The suggestive frequency with which jaundice attacks of epigastric pain simulating biliary colic cirrhosis and gall stones occur in many of the diseases for which splenectomy is advocated necessitates an accurate record of the condition of the liver gall bladder and bile passages. Such observations will ultimately possess specific value in the elucidation of the obscure but unquestioned intimate relation ship between the spleen and the liver.

The dislocation of the spleen from its position against the diaphragm and the left kidney (Fig. 2) should be the first step in the actual removal of the organ. The separation of the diaphragmatic adhesion can usually be safely accomplished by the finger. If

it is found that the adhesions have acquired blood vessels of sufficient size to require ligation it is then even preferable in most cases to postpone such ligation (unless the vessels be reasonably accessible) until the spleen has been removed the bleeding being temporarily controlled by a gauze pack described later. In an occasional case however adhesions cannot be stripped with safety and they must be divided between long curved forceps care being taken to engage only the adhesions in the clamps. Hartmann and other have advised that the operation be abandoned when these adhesions appear formidable. However we have not recently found such conditions to be prohibitive to splenectomy although in some cases absolute hæmostasis has been secured with considerable effort.

Immediately the spleen has been dislocated a long hot abdominal pack is efficiently arranged in the space formerly occupied by the spleen until the entire area with which the organ has been in apposition is under firm pressure by the gauze (Fig. 3). This accomplishes two purposes. First and most important the oozing surfaces are compressed and as the bleeding is usually venous it is controlled without subsequent ligation if the pack (a point emphasized by W. J. Mayo) is left undisturbed until the actual operation is completed. Second an excellent support is provided for the safe manipulation and mobilization of the organ the division of adhesions and ligation of the main pedicle

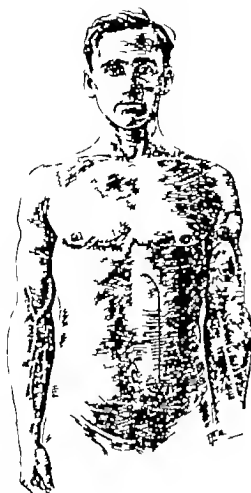


Fig. 1. Breen's incision as adapted for splenectomy.

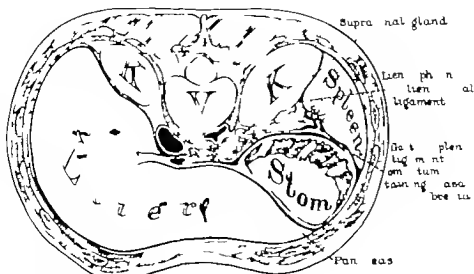
The spleen having been elevated in this manner its further connections are the main splenic pedicle with its peritoneal investment (the lienorenal ligament) the gastrosplenic omentum and in splenomegaly of long standing various adventitious adhesions. The most satisfactory isolation and treatment of the splenic pedicle is obtained by the preliminary division of the accessory adhesions as well as the peritoneal attachments and reflections. The gastrosplenic omentum should first be divided in sections as close as possible to the spleen, between ligatures. The only named vessels encountered are the vasa brevia, which arise from the splenic artery at variable points, pass to the greater curvature of the stomach, in this peritoneal

fold and finally anastomose with the left gastro-epiploic. In dealing with the upper edge of this gastrosplenic omentum it must be remembered that here the fundus of the stomach is normally in very close apposition to the spleen. It is necessary therefore always to determine the exact relationship and protect the stomach from injury in its separation from the spleen. In an earlier experience I accidentally included in a clamp and excised a small area of the wall of the stomach the resultant opening however being readily closed without post-operative complication. At the lower pole of the spleen there is an occasional fibrous attachment derived from the phrenocolic ligament, which with the other adhesions should be separately ligated.

The spleen may now be further mobilized by careful dissection of the peritoneal and fibrous coverings of the splenic pedicle. The localization of the tail of the pancreas is the important feature of this mobilization, and as the relationship of the organ is not constant it is necessary to inspect it in all cases. In some instances the tail is short lying against the renal surface of the spleen on the posterior aspect of the pedicle and it may be fitted so closely into the hilus of the spleen as to have acquired a concave edge. In other cases the tail is attenuated it is in front of the splenic vessels and in contact with the gastric surface while often it does not extend into the operative field.

Figure 4 shows the spleen turned turtle and represents a frequent relationship of the pancreas to the splenic pedicle. It is quite obvious that such a pedicle would not be ligated without including a portion of the pancreas. Figure 5 (frontspleen) shows that with the reflection of the lienophrenic ligament a better exposure is obtained of the tail of the pancreas that it can be detached from its original position by dissection and allowed to drop back from the hilus of the spleen.

Therefore after such dissection the splenic pedicle consists, from a surgical standpoint of the splenic artery and its veins. The artery in some instances has divided before reaching the hilus of the spleen, although it often continues as a single trunk well into the hilus



Rede from Todd's Anatomy

Fig. 2. Diagrammatic representation of the position of the gall bladder.

while the veins are always in two or more branches. The latter do not bear a fixed position as regards the arterial trunks lying in front in some instances and behind in other. They are always distinctly larger than the artery itself and their extreme friability must always be considered. The arrangement of the vessels of the pedicle is fan-shaped as in Fig 5 or 6 the breadth varying in different cases.

At this point it is possible to decide whether it is best to treat the pedicle *en masse* (Fig 6) or to ligate it in section (Fig 5 frontispiece). The latter method is to be preferred and the dissection of the pedicle is usually most advantageously carried out on its posterior aspect with the spleen tracted toward the midline. The extent to which the spleen can be lifted out of the abdomen by careful traction is surprising, if following the division of the

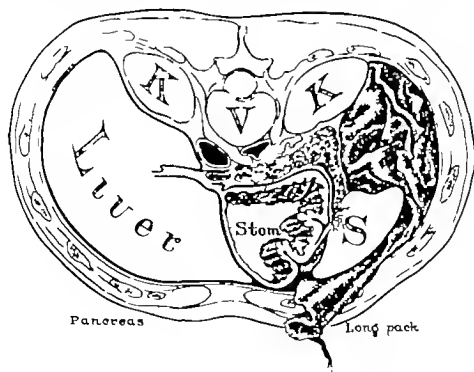


Fig. 3. Position of the gall bladder.



Fig. 4. Posterior surface of spleen exposed, showing tail of pancreas which lies in the splenic pedicle posterior to vessels. The pancreas should be dissected from its position before clamps or ligatures are applied.

peritoneal and fibrous investments of the pedicle certain of the lateral venous trunks are separately isolated and divided between ligatures (Fig. 5 frontispiece). It should again be emphasized that caution must be exercised in the degree of traction to which the pedicle is subjected and in the dissection of these veins. It is chiefly because of the normal tortuosity of the splenic artery that this elongation of the pedicle is possible and thus facilitates its secure ligation. We have recognized the advisability of first securing where it is possible the arterial supply so that the spleen may partially empty itself of its contained blood through the unclamped veins before these are ligated.

If on account of the arrangement of the veins and arterial branches, ligation in sections is not advisable ligation *en masse* by the two-clamp method, will prove a satisfactory and safe method. Two curved clamps

are arranged on the pedicle with a third clamp on the splenic side to control back bleeding and the spleen is removed. A double strand of No. 2 plain catgut is tied with moderate tension in the crushed line of the inner clamp as a partial control and a second strand is transfixed below the distal forceps as the actual control.

Having made certain by either of these methods that the pedicle is securely ligated the large hemostatic pack is removed the newly exposed surfaces inspected, any oozing points being separately secured by fine catgut on a needle and absolute hemostasis assured.

The disease or condition for which splenectomy is done governs largely the technical difficulties and risk of the operation. I have found for example that in pernicious anemia the removal of the spleen can be accomplished with comparative ease and safety. Although

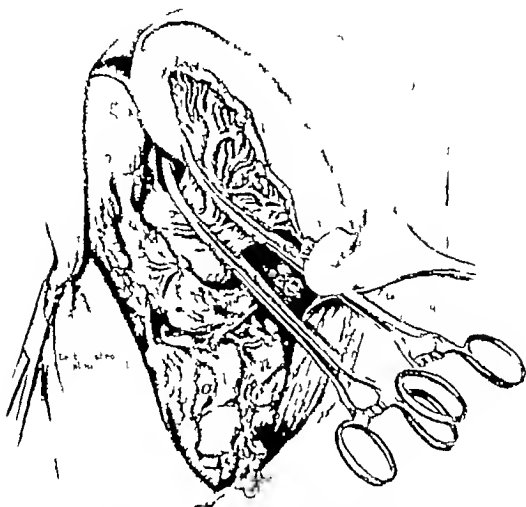


Fig. 6. Retroperitoneal attachments separated, mobilizing spleen and permitting application of clamps. Pedicle to be divided at dotted line.

enlargement of the organ has been present in those cases in which we have advocated surgical treatment, adhesions are few and usually insignificant. The pedicle is as a rule small and in a relatively small percentage is its treatment complicated by the relationship of the pancreas. Furthermore the risk of the operation in this disease can be minimized by intelligent pre-operative treatment and observation as well as by the careful selection of the cases. There must be a rational basis upon which splenectomy in pernicious anemia is advocated, as well as strict recognition of the limits of operative safety. Splenectomy is definitely contra-indicated during an acute crisis or in a period when the patient shows a steady decrease in haemoglobin and red blood-cells or when

mental torpor, cord changes and oedema mark the terminal stages of the disease. Repeated transfusions from a suitable donor will frequently carry the patient through most critical exacerbations of the disease and the proper interpretation of the reaction following transfusion is essential. Further it is important that a satisfactory donor be available after operation.

In splenic anaemia splenectomy is associated with a higher operative risk and greater technical difficulties than it is in any of the more common diseases of the spleen. In the cases I have seen the spleen has been usually of large size, the vessels very friable and adhesions occasionally troublesome. Patients in the late stages of the disease are prone to develop fever, ascites, cirrhotic liver or severe

anaemia, which conditions contribute to the seriousness of the operation. The only instance in which I thought it inadvisable to attempt splenectomy was in splenic anaemia with great ascites, atrophic cirrhosis, and aneurismal splenic vessels. The friability of the veins in this disease was especially demonstrated in a baby 22 months old upon whom I performed splenectomy for typical splenic anaemia of the adult type.

The operation in haemolytic jaundice is of relatively little risk and there has been no particular difficulty in the removal of the spleen, although the organ is occasionally very large. It is however most important to avoid splenectomy during an exacerbation of the symptoms. Of the cases I have seen of this disease the only operative death occurred in a patient in whom I failed to realize the import of a subacute and subsiding acholuric crisis.

In those cases of cirrhosis of the liver associated with splenomegaly in which splenectomy is to be considered the spleen is often firmly adherent, and this fact together with the

poor general condition of the patient makes the operation rather hazardous. Nevertheless, in the cases we have selected for operation there has been no operative mortality and in two cases of my own most striking benefit has thus far followed the removal of the spleen.

In the rarer conditions such as syphilitic spleen and idiopathic splenomegaly the operation itself is not of great risk. It has been interesting to note the result of splenectomy in two cases of splenomegaly with specific history and positive Wassermann. In both of these it had been previously possible to obtain a negative Wassermann by salvarsan but it would become positive on discontinuing the treatment. Since splenectomy the Wassermann has remained negative.

From my own experience I have found that the features to be emphasized in the technique of splenectomy are (1) the abdominal exploration, (2) the dislocation of the spleen (3) the use of a hot gauze pack (4) the protection of stomach and pancreas from injury, (5) the preliminary ligation of adhesion and (6) the treatment of the splenic pedicle.

THE ETIOLOGY OF UTERINE PROLAPSE AND CYSTOCELE¹

By GIBBON FITZGIBBON M.D. F.R.C.P.I. DUBLIN, IRELAND
Gynecologist, Royal City of Dublin Hospital

THE subject of uterine prolapse and cystocele is one upon which there has been a great deal written and still new operations are constantly being described involving the removal of the uterus the distortion of parts and even the complete obliteration of the genital tract. There is surely some method by which the structures that normally support the uterus and vagina can be restored to functional activity and at the same time leave the organs which have to be supported intact in approximately normal positions and possibly capable of functioning—some operation which can be adopted as the all around basis for the surgical cure of the condition.

The majority of the cases of prolapse are met in women who have borne children. The prolapse is the result of damage caused by the passage of the foetus through the pelvis. In this act some structure which before labor was capable of supporting the uterus must be rendered incapable of doing so subsequently. The probability is that it is the same structure which is damaged in all or almost all the cases.

Prolapse occurring in nulliparous women is probably due to the same defective structures but there has not been any cause of laceration and therefore the prolapse must be due to some congenital defect of the supporting structures. This places these cases in a different category as the supporting structures even though not injured are incapable of supporting the uterus and any operation is subject to the doubt as to whether the tissues can be made capable of doing what they have already proved incapable of.

That the perineum and that part of the levator ani muscles which is torn with the perineum have no part in the support of the uterus is made evident by the fact that these structures may be extensively lacerated and this even when of long standing has no evident effect upon the level of the uterus. Lacerations

of these structures lead to the condition of rectocele in which the rectum bulges forward and downward into the vulva stretching the posterior vaginal wall in its lower half but leaving the upper half and the posterior fornix unaffected. The condition of rectocele is completely cured by a plastic operation upon the levator ani muscles and the perineum and the restoration of the parts to their normal condition.

On the other hand there are numerous cases of prolapse of the uterus where the cervix comes down to the vulva or even the uterus is completely extruded yet the perineum and levator ani are intact showing that some other structure is responsible for their maintenance and that the levator ani muscles are not capable of replacing this support. The facts definitely prove that the structures which support the lower half of the posterior vaginal wall have no part in the support of the uterus and therefore may be excluded in looking for the cause of prolapse of the uterus which must do damage to some structures above the level of the levator muscles.

The structure which is next met with in the pelvis above the levator muscles is the visceral or endopelvic layer of pelvic fascia and as I believe this is the main if not the sole support of the uterus and bladder I wish to give a very full description of its attachments and relations.

The pelvic fascia as shown by Cunningham (1) is a direct continuation of the abdominal fascia which is easily demonstrated as a continuous sheet lining the interior of the abdominal cavity and placed between the muscles and the peritoneum. The relative position of the pelvic fascia is identical and the visceral layer passes inward from the pelvic walls upon the upper surface of the levator ani and forms a complete fascial diaphragm to close the pelvic outlet. It springs in part from the back of the symphysis and the pubic ramus about the level of the junction of the lower

and middle thirds of the symphysis. From here it runs under the bladder and forms the true anterior ligaments of the bladder. It surrounds the urethra and is intimately connected with the base of the bladder upward along the walls of which it sends numerous fibers as well as others downward along the urethra. The fascia passing under the base of the bladder is closely connected with the anterior wall of the vagina and is continued backward to be attached to the supravaginal cervix where it helps to form the anterior vaginal fornix. This part of the fascia is very definite and usually described as the anterior true ligament of the bladder. It binds the bladder and urethra firmly to the posterior wall of the symphysis.

The next part of the pelvic fascia springs from the pubic ramus and the white line first at the level of the top of the obturator foramen and from the inner surface of the ischial spine. It runs inward above the levator ani muscles toward the vagina, bladder, cervix, and rectum and divides into the vesical, vesicovaginal, rectovaginal and rectal layers. The posterior part of the fascia here surrounds the rectum, and follows its walls as the rectal layer at the same time giving some support to the upper part of the posterior vaginal wall where that is in relation to the anterior wall of the rectum, and this part constitutes the rectovaginal layer. The anterior portion of this fascia is stronger and thicker than the rectal portion, and constitutes the vesicovaginal layer. As it runs inward toward the viscera it divides into numerous layers and becomes intermixed with loose connective tissue, which makes the demonstration of the whole fascia almost impossible close to the viscera. Nevertheless, the continuity can be shown and the different layers followed to lose themselves upon the walls of the viscera or to join the fascia of the other side. It is connected to the sides of the bladder and continuous with the anterior fibers of the fascia which pass under the base of the bladder. It passes across the pelvis between the anterior vaginal wall and the base of the bladder and is attached to the cervix uteri and the lateral vaginal fornices, above which it passes to reach the cervix and to become continuous with the

rectovaginal layer between the posterior vaginal fornix and the rectum and below the posterior cul-de-sac of peritoneum. The attachment of the fascia to the viscera is shown by Cunningham (2) in a dissection on the male and the same relations of the fascia to the viscera exists in the female, the vagina and the cervix uteri taking the place of the prostate.

In the region of the lateral vaginal fornices and the sides of the cervix, where the uterine vessels approach the uterus there is a very marked increase in the amount of fibrous tissue in which the uterine vessels run. This extra fibrous tissue forms a distinct fan shaped band lying between the lateral vaginal fornix and the side of the cervix in the plane of the broad ligament. This band has been described by Mackenrodt (3) as the transverse ligament of the cervix. It is part of the pelvic fascia and plays a part in the support of the uterus and vagina with the rest of the fascia from which it should not be dissociated. Hart (4) refers to this as the loose fatless tissue 0.8 inches thick with abundant blood vessels and lymphatics surrounding the lower portion of the uterus and upper portion of the vagina and says it was first described by Virchow and called the parametric tissue and is clearly shown by Freund in sections at the level of the supravaginal portion of the cervix.

This intermediate part of the endopelvic fascia between the ligaments of the bladder and the rectal layer is usually described as if it merely formed a sheet above the levator ani muscles, and the rectovaginal and vesicovaginal layers as though they passed between the viscera just above the fibers of the muscle, whereas the fascia is at a higher level in this part than the levator muscle. In section through the female pelvis this part of the fascia does not show up distinctly because the fascia is not in a distinct sheet and when the fibers are divided they retract in the loose tissue and do not show on the surface consequently the fascia is omitted in the region of the vaginal fornices and cervix, and that part which can be demonstrated as a sheet by dissections just above the levator muscles is depicted as the whole of the vesicovaginal

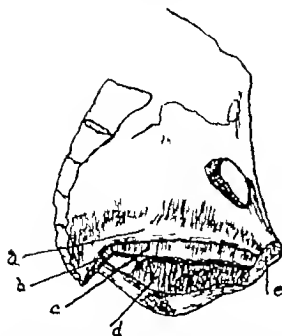


Fig. 1 Showing the origin of the visceral layer of pelvic fascia from the inner wall of the pelvis with the levator ani muscle arching just below it. a Visceral layer of the pelvic fascia springing from white line b coccygeus, c levator ani d parietal layer of pelvic fascia e pubic bone.

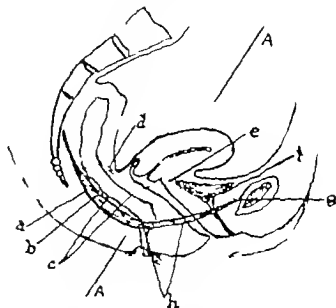


Fig. 2 Showing the division of the endopelvic fascia into the various layers: connection with the sacra, the abundance of fascia in the region of the vaginal fornices and cervix uteri and under the base of the bladder above the anterior vaginal wall. a Anal fascia b levator ani c recto-anal layer d recto-anal layer e vesico-anal layer f vesical layer g anterior ligament of bladder h lower layer of endopelvic fascia A 4 4 plane of section in Fig. 3

layer Where the fascia springs from the pelvic wall it can be seen as a distinct sheet but where it comes into relation with the viscera it loses the character of a sheet and divides up into various layers. The necessity for this is obvious when the dilatation which must occur during parturition is considered. If the fascia remained a single sheet where it is pierced by the cervix and the vagina the aperture would be incapable of dilatation whereas by means of the fascial fibers separating and running at different levels the supporting power is not diminished and the dilatation of the aperture is possible.

The description of the fascia in Cunningham's *Anatomy* together with his diagrams makes this perfectly clear. He deals with the fascia chiefly in the male subject and refers to this description when describing the fascia in the female. He says the rectum below the rectovaginal pouch of peritoneum is in apposition with the posterior wall of the vagina a layer of pelvic fascia the rectovaginal alone intervening. His illustrations show this part of the fascia distinctly as well as the vesicovaginal layer except that the prostate is shown instead of the vagina

and he says the rectoprostatic fascia is called the rectovaginal and the vesicoprostatic fascia the vesicovaginal. Cunningham (5) also describes the fascia in connection with the female pelvis as the endopelvic fascia and divides it into an upper portion attached to the upper parts of the vagina and cervix and in front of these passing between the vagina and bladder to reach the mesial plane and lose itself upon the walls of the viscera, while the lower layer is that part of the fascia which follows the levator ani muscles and is inserted into the perineal body. The relation of the viscera to the pelvic fascia is such that the bladder rests on the upper surface of the fascia in front. The vagina owing to the backward and upward direction of its axis passes through the plane of the fascia at an acute angle so that its anterior wall which is facing upward and forward is in relation to the under surface of the fascia at that part upon which the bladder rests. Behind this the fascia passes obliquely across the sides of the vaginal fornices and over the top of them being attached to the cervix, and the posterior vaginal wall being longer than the anterior is continued back so as to pass

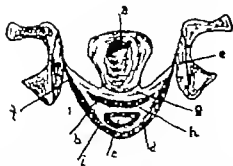


Fig. 3. Coronal section through pelvis showing the division of the visceral layer of pelvic fascia into layers in relation to the viscera. Uterus, *b* vagina, rectum, *d* levator ani, *e* obturator internus *f* visceral pelvic fascia, *g* vesicovaginal layer *h* rectovaginal layer *i* rectal layer

through the plane of the fascia behind the cervix. In this way the vagina is almost altogether below the plane of the fascia and has its attachment by fibers to the under surface. At the same time the fascia sends numerous fibers to all parts of the vaginal wall.

The cervix uteri definitely passes through the fascia, the vaginal portion being below the supravaginal portion above the plane of the fascia but owing to the oblique direction of the axis of the uterus running forward there is a greater attachment of the fascia in front of the plane of the broad ligaments than behind so that the vesicovaginal layer practically forms a sling across the pelvis, attached to the sides of the cervix and upon which the uterus lies when antverted the fundus resting upon the upper surface of the bladder.

The other ligaments of the uterus appear to be concerned only in the control of the fundus. The broad ligaments and the round ligaments can have no part in the support of the uterus. The latter with the uterus in anteversion are completely relaxed, the distance from their points of origin and insertion being considerably less than the length of the ligaments. The uterosacral ligaments are more difficult to be definite about. They are situated at a higher level than the pelvic fascia, and from the direction in which they run they would draw the cervix upward and backward. From their nature they do not seem capable of supporting the uterus, and a fact which rather bears this out is that in

cases of prolapse they are found greatly elongated but not ruptured showing that they fail and stretch when the weight of the uterus is thrown upon them. There is no evidence that they are liable to damage in labor and therefore why should they so frequently fail in their function after labor?

Retroversion of the uterus is sometimes stated to be a predisposing cause of prolapse but there is clinical evidence that it is not necessarily the initial stage and from the enormous frequency of cases of retroversion in which there is no prolapse even when the retroversion has existed for a very considerable length of time and particularly in those cases where it occurred after parturition it may be concluded that the position of the uterus has no influence upon the supporting structures and that retroversion in the early stages of prolapse is only a concomitant and not a predisposing cause although it is an ultimate development in all cases.

Although I have stated that damage to the levator ani muscles has no effect upon the support of the uterus they and the fascia have a correlated function. The levator ani form almost as complete a sheet as the fascia across the pelvis and these two sheets together form the pelvic diaphragm. The condition is exactly analogous to the abdominal walls

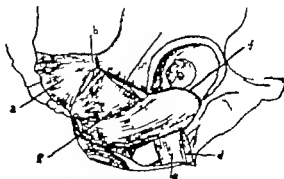


Fig. 4. Showing the levator ani muscle from the outside. It can be seen how impossible it would be for any laceration extending from the vagina to involve the posterior and higher fibers which support the vaginal fornices and uterine cervix. Lacerations can only involve the fibers which spring from the pubic bone and run backward past the vagina to surround the lower portion of the rectum and be inserted in the perineal body. Coccygeus, *a* ischiial spine, *b* anal fascia, *c* ischiolum cut away *d* vagina, *e* aorticolum cut through, *f* levator ani, *g*

tend out and involve the vaginal fornices. If these are examined it will be found that they nearly always take a curved direction when they reach the fornices so that they partially encircle the cervix. They thus involve the attachment of the fascia to the fornices and cervix in a direction transverse to the fibers of the fascia. The degree of evident laceration is no guide to the extent to which the fascia is involved; the fascia may be extensively lacerated even when the cervix is intact. The result is that the fascial sling across the pelvis is interrupted; the fascial ends being only connected to the viscera by loose connective tissue which stretches before the constant strain from above. The fascia is still there and the detached ends at their normal level, but the uterus is able to pass down between them.

Besides laceration in the region of the vaginal fornices laceration may occur in front of the cervix where the fascia bridges across the anterior fornix and passes between the anterior vaginal wall and the bladder. In which case the bladder protrudes between the edges of the fascia and forms a cystocele. These two varieties of laceration may exist separately or together. When in the region of the lateral fornices alone, there results prolapse of the uterus with consequent inversion of the vaginal fornices, but there is no cystocele. The base of the bladder is still supported and the anterior vaginal wall relatively long. The prolapse is usually partial. When the anterior fascia alone is involved the uterus and vaginal fornices retain their normal position but the bladder prolapses forming a cystocele displacing the free edges of the fascia outward and stretching the anterior vaginal wall. When laceration occurs in the two sites, there is prolapse of the cervix and vaginal fornices as well as a protrusion of the bladder; the uterus comes down and the whole anterior vaginal wall becomes inverted.

These different conditions should be clearly differentiated. They are all the result of laceration of the fascia, but the site of laceration is different. They are analogous to abdominal hernias through scars. The recognized method of curing these hernias is to clear the edges of the fascia and unite them

directly and if this is done it does not matter how the other tissues are dealt with. Exactly the same condition prevails in the cases of prolapse of the uterus and cystocele except that the organs which become displaced have a definite position to which they should be returned, and are attached to the fascia whereas the contents of an abdominal hernia has only to be returned to the abdomen and the sac obliterated.

I believe almost all cases of prolapse and cystocele can be dealt with on these lines. There is no difficulty in reaching the fascia at the sides of the cervix and above the lateral fornices, through an anterior colpotomy incision when the bladder is pushed up from the front of the uterus and well out to the sides so as to clear the fascia above the lateral fornices and by stripping the anterior wall away from the bladder at each side of the vertical incision.

The old operation of anterior colporrhaphy and colpo-perineorrhaphy was most unsatisfactory but occasionally resulted in cures even in pronounced cases. I believe these cures were effected upon the lines suggested above. In taking away the anterior flap of vaginal mucous membrane the incision was made sufficiently far out to reach the pelvic fascia and enough was caught in the sutures to re-construct the pelvic sling.

In the present day operations for prolapse especially the Schauta Wertheim type there is one common feature, the high amputation of the cervix which is done to reduce the size of the cervix and considered essential for success, although it must be admitted that numerous cases have very small atrophic uteri and proportionally small cervical portions. The amputation is done well above the vaginal level and the stump covered by the vaginal flap.

I believe it is absolutely impossible to amputate the cervix as described, without reaching the pelvic fascia, and the curative results are due to the inclusion of the fascia with the vaginal mucous membrane in covering the cervical stump. As for the interposition part of the operation, it only relieves the cystocele and does so by using the uterus to bridge the gap in the pelvic fascia. It has

no part in supporting the cervix and is ineffective in the absence of independent means for doing this. It has the disadvantage that it necessitates future sterility and although this only effect, a small number of cases if they do not agree to it the only alternative is palliative treatment or an operation which will only give relief for a short time. As a result of failure with the Schauta Wertheim operation there has recently been suggested a form of vaginal hysterectomy the author (6) of which says the interposition operation is very efficient in the relief of partial prolapse with extensive cystocele. The best results being obtained in cases under forty years of age it should not be adopted in the third and fourth degrees of prolapse. These cases are to be treated by hysterectomy the broad ligament are to be united in the mid line and the free edges stitched close to the urethrovaginal junction so as to compel the bladder to rest on the broad ligament. In this operation the base of the broad ligament when they are separated from the cervix are firmly united together and thus I believe the part of the operation which really cures the prolapse of the vaginal fornices and without which the elevation of the bladder would have no effect. It is again a reunion of the pelvic fascia which is done without removing the uterus would be really effective in curing the prolapse.

What I wish to emphasize in connection with these operations is that the one common item is plastic work in the region of the lateral fornices and cervix but that the importance of this is not recognized and credit for what is effected by this is given to other parts of the operation which are not essential while many of the unsatisfactory results are due to non appreciation of what is the essential part of the operation in cases of prolapse.

The lines upon which I suggest prolapse and cystocele should be treated were pointed out by Alexandroff ten or more years ago and advocated by Hastings Tweedy (7) but they have not been followed or recognized by the profession with the result that the surgical treatment remains unsatisfactory

and is chiefly upon lines which involve the interference with the function of childbirth and is therefore rendered unattractive for an important class of case—the younger women still in the childbearing period of life and probably desirous of having more children.

CONCLUSIONS

1. Prolapse of the uterus and cystocele are due to damage of the pelvic fascia in the region of the lateral fornices and in front of the cervix.

2. Prolapse of the uterus must be clearly differentiated from cystocele they may exist separately or be combined.

3. Laceration of the perineum and levator ani muscles has a part in the production of prolapse. It allows an increase of cystocele when there is the primary defect.

4. Retroversion of the uterus has no tendency to produce prolapse.

5. Prolapse of the uterus and cystocele are analogous to abdominal hernia through scars due to defective union of the fascia.

6. The cure of the condition can be effected by reuniting the fascial diaphragm across the pelvis.

7. The fascial diaphragm can be repaired without interfering with the function of the uterus or dislocating the bladder.

8. The condition can be treated in exactly the same manner before and after the menopause.

9. Atrophy of the uterus has no influence upon its support.

10. Amputation of the cervix other than the removal of an hypertrophied lacerated vaginal portion is not necessary.

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THE TRANSPANCREATIC APPROACH TO THE COMMON BILE-DUCT

TRANSPANCREATIC CHOLEDOCHOTOMY

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THE operative measures available for the removal of calculi from the gall-bladder and the upper part of the common bile-duct in a general way evince technical excellence and have well-defined indications for their employment. On the other hand, the underlying principles and the indications for the removal of gall-stones impacted in the terminal part of the common bile-duct or the papilla of Vater are not clearly understood. This seeming obscurity as to the best method appropriate for the treatment of stone impacted in the terminal part of the common bile-duct is explained partly by the fact that owing to the infrequent performance of these operations the average surgeon has but a minimal experience in this field.

The methods proposed in the standard textbooks for the removal of stones in this region represent mainly the personal experience of individual surgeons. The deductions are not based on statistical analyses of large series of cases collected from many clinics. Any operation proposed for the removal of calculi impacted in the terminal part of the common bile-duct is necessarily intricate and difficult. Technical simplicity is intrinsically impossible owing to the anatomical relations of the structures concerned, for at this point the duodenum, the pancreas and the common bile-duct meet at a common center.

At the risk of being prolix, the writer adds another operation for the removal of calculi impacted in the terminal part of the common bile-duct. By this method calculi can be removed from the terminal part of the common bile-duct by an incision in the head of the pancreas. The operation may be properly termed transpancreatic choledochotomy. An experience occurring to the writer furnished the incentive to this study, the object of which is to establish the practicability of

the operation he employed and to bring it forward into the light of publicity. In order to describe clearly the operation the topographical anatomy of the common bile-duct is briefly reviewed and an outline furnished of the operative methods usually recommended for the removal of calculi impacted in the terminal part of the common bile-duct.

Anatomy of the common bile-duct. Anatomists do not agree in regard to the terminology used in the description of the various segments of the common bile-duct. The division appears artificial and arbitrary. The clinical surgeon has contributed an additional classification on the terms of which express more or less a working knowledge of this region. A great deal of the confusion and obscurity of the terminology exist in regard to the terminal part. This is natural, as many anatomical textbooks fail to state clearly the exact relations of the common bile-duct to the pancreas.

The classification of Testut is generally used. He divides the common bile-duct into four parts, namely the supraduodenal, the retroduodenal, the pancreatic and the intraparietal. The use of the first two terms has been criticized by D'Este on the ground of inaccuracy. He maintains that the common bile-duct is never superior to the first part of the duodenum and that therefore the term supraduodenal is a misnomer. This is mentioned in passing but the soundness of the criticism is not considered as the main theme concerns the lower part of the duct. The common bile-duct measures 6.5 to 8 cm. in length. The supraduodenal part is almost 3 cm. long. It is intimately related to the structures contained in the foramen of Winslow and to those leaving and entering the transverse fissure of the liver that is, the hepatic artery, the portal vein, and the lymphatic vessels. At the level of

the foramen of Winslow the common duct occupies the free border of the gastrohepatic omentum. At this point the hepatic artery is but one to two millimeter distant from the left border of the common bile duct. Occasionally the artery divides prematurely, remaining at first quite distant from the common bile-duct, ultimately crossing the hepatic duct obliquely. While other anomalies occur the hepatic artery is easily avoided during operation on the common bile duct.

The closer relation of the first part of the common bile-duct concerns its anterior part. The chief relation is with the portal vein. The common bile duct is situated in a plane anterior to the portal vein. One lymphatic node is constantly behind the foramen of Winslow and lower down one or two nodes regularly separate the common bile duct from the hepatic artery.

The second retro-duodenal part of the common bile-duct measures 0.5 to 1 mm in length. In front of the duodenum while posteriorly are the inferior vena cava and the kidneys.

Testut applies the term pancreatocolic to that part of the common bile-duct which extends from the inferior border of the first part of the duodenum to the point where the duct penetrates the wall of the duodenum. It is synonymous with the intra-duodenal part of other authors. It measures 0.5 to 1 mm in length. It relation have been accurately studied by Quenu who states that it traverses a quadrilateral whose border are limited above by the inferior border of the first part of the duodenum, below by the superior border of the third part of the duodenum, externally by the inner border of the second part and internally by the superior mesenteric vein. According to Testut the course of this portion of the duct may be indicated by an oblique line starting from the inner one third of the inferior border of the first part of the duodenum and ending at the middle of the internal border of the second part of the duodenum. This anatomical quadrilateral of Quenu plays an important part in the operation to be described—trans-pancreatic choledochotomy. It contains the pancreatic portion of the common bile-duct

and its boundaries should be definitely outlined to locate this portion of the common duct. It serves as a guide. In the quadrilateral space described by Quenu as one approaches the duodenum the thickness of pancreatic tissue in front of the common bile duct diminishes from above downward. At the inferior border of the first part of the duodenum it increases to uncover a layer 14 to 15 mm thick in order to reach the common bile-duct. At the middle of this space square the pancreatic duct measures 0.5 mm and at the border of the second part of the duodenum is more than 1 mm. Behind the inferior vena cava and in front of the head of the pancreas, high in turn covered by the branches of the superior and inferior pancreaticoduodenal arteries and by the posterior peritoneal peritoneum.

The intrapancreatic part of the duct which lies within the wall of the duodenum, it penetrates the intestine at the point where the posterior surface becomes the lateral. It passes obliquely through the muscular wall finally in conjunction with the duct of Wirsung in the ampulla of Vater. The base of this small mesenteric cavity is directed upward and to the left. A small transverse slit in the firm transparent one ductal penning in the other.

The diameter of the ampulla measures 6 to 8 mm. The base corresponds in size to the collective extent of the sinces of the two anal the umbilical narrowing considerably and ends in a small opening round or elliptical in shape which seen from the free side of the intestine appears as a tubercle. This forms the caruncula major of Santorini or the papilla of Vater. A smaller projection exists above the caruncula major of Santorini which indicates the duodenal termination of the accessory duct of the pancreas—the duct of Santorini. According to Corning the arrangement of the termination is related is subject to many variations though the above description applies in the majority of the cases. Corning states that the part described by Testut as the pancreatocolic is completely enclosed in pancreatic tissue in 50 per cent of all common bile-ducts.

The term juxta-terminal is applied to

the lower part of the pancreatic segment in conjunction with the intraparietal part by D'Este who states that the expression has a surgical value as it indicates the most frequent site of calculi in this region. He insists that these two sections should be combined and considered as an anatomical entity.

OPERATIVE METHODS EMPLOYED FOR THE REMOVAL OF IMPACTED STONES IN THE COMMON BILE DUCT

In general, an endeavor is made to push the stone into the supraduodenal part where it may be removed through a small vertical incision. If the stone is adherent, usually to the mucous membrane a pair of forceps may be introduced to free it. Irrigation is of doubtful value, though it may aid in the removal of small stones. Massage or manipulation is better but one must be careful not to crush the stone as the small fragments may remain as nuclei for secondary calculi. This operation, called choledochotripsy was first done by Courvoisier. It is indicated in soft cholesterol stones. A major objection is the possible persistence of the detritus to form nuclei of secondary calculi.

When manipulation, irrigation, and massage fail, which is seldom, a direct attack is imperative. The question now arises as to which anatomical approach is best.

The exposure of the common bile-duct where it lies behind the duodenum, by mobilization of the duodenum as suggested by Kocher is of great utility and has many advantages. The technique employed to accomplish this operation has been formulated clearly by Kocher who emphasizes the anatomical importance of the posterior parietal peritoneum which passes from the duodenum to the anterior face of the kidney forming ultimately the upper layer of the transverse mesocolon. In freeing the duodenum the duct is carried with it. It is plainly exposed, and may be directly palpated. When the duct is incised the operation is called retro-duodenal choledochotomy. It is doubtful whether direct incision is of value. In emaciated patients, the continuous loss of so much bile to the body through external drain-

age is objectionable. This opinion is held by Kocher and Lennander who believe that in these cases the bile should be left, if possible to drain into the intestine. Again, injury to the duct of Wirsung is possible, as has occurred at the hands of Kocher and Kraske. Berg alters the technique by draining the hepatic duct. The incision in the common duct may then be sutured. The possibility of retroperitoneal suppuration is an additional argument against incision into the duct in this region.

The chief value of the operation of mobilization of the duodenum is that the stone may be dislodged and pushed up into the supraduodenal part where removal is easily effected. Riedel, Pavr, Lorenz and Berg state that the stone can be displaced in the majority of the cases. However Kocher and Kehr agree that this is occasionally impossible owing to the existence of a pericholedochitis or to the encirclement of the common bile-duct by pancreatic tissue.

The transduodenal operation was first performed by McBurney and soon repeated by Czerny and Mayo Robson. Kocher states that this is the best operation for an impacted stone in the ampulla. He recommends mobilization as an aid in the operation. The duodenum should be opened transversely as there is less likelihood of wounding the blood vessels and the resulting wound is easier to suture. The papilla may be cut, though often simple tearing or expressing is sufficient. The duodenum is sutured in the usual fashion.

That another operative method exists for the removal of impacted calculi in the ampulla of Vater is not widely known. This route is through the head of the pancreas. The writer has performed this in one instance where the pathologic and anatomic conditions prevented the use of other measures. The choice of this method was entirely fortuitous, as he was unaware at the time of any previous work on the subject. Although limited to a single case, his personal experience demonstrates that it is feasible to remove calculi from the ampulla of Vater by direct attack through the head of the pancreas. The patient presented every complication tending

to make difficult any abdominal operative procedure that is a large fatty pendulous abdomen extreme distention of the intestines and a marked depth to the wound. The brief survival of the patient naturally eliminates from the discussion in this particular instance the possibility of objectionable sequelae as pancreatic and duodenal inflammation or fistula. It is indeed regrettable that the clinical test is lacking. However, the pathologic investigation obtained is of value in showing the absence of any injury to the duct of Wirsung.

To illustrate the operation the following case is reported. The patient was admitted to the second surgical division of Fordham Hospital in the service of Dr. W. P. Healy through whose courtesy the writer operated on and reported this case.

Irene N., married, age 46, Russian, admitted November 8, 1914. One day ago she was attacked by this pain in the abdomen vomited several times and the abdomen became markedly distended. The patient was somewhat turgid and apparently extremely toxic. The face was somewhat cyanotic. The tongue was coated. The heart sounds were distant though no murmurs were heard. Examination of the lungs was negative. The abdomen was tremendously distended. The abdominal wall was very thick with fat. There was slight rigidity and tenderness in the upper right quadrant. The abdomen was tympanitic throughout. Temperature 102.3.5 pulse 130 respiration 30. Leucocytosis 23,000. 83 per cent polymorphonuclears.

The lesion was recognized as existing in the upper abdomen. Acute pancreatitis was decided upon as the most likely diagnosis owing to the existence of the extreme distention coupled with the peculiar cyanotic appearance of the face. These two symptoms we have noted occurring fairly often in a case of pancreatitis. Immediate operation was decided upon.

Operation. Ether narcosis. The intestines were tremendously distended. A systematic exploration showed that the liver was enlarged but no abscess was present. There was a moderate amount of brownish fluid in the right flank. The omentum presented a chewed up appearance characteristic of fat necrosis. The pancreas was greatly swollen and enlarged. The gall bladder was tense. It was opened and five stones were removed from the cystic duct. Palpation through the duodenum disclosed a calculus situated in the terminal part of the common bile duct. All efforts to displace it up into the supraduodenal part failed. Owing to the obesity mobilization of the duodenum was im-

possible. No effort to incise the posterior peritoneum could be made with success or safety. Also the depth from the margin of the wound to the duodenum was so great and the distention so marked that I desisted from opening it. As I held the duodenum forward on my finger I indirectly lifted up the pancreas. The idea came to reach the stone through the pancreas. A small nick was made in the pancreas and I quickly came upon the stone. I incised the duct wall and was about to grasp the stone when the supporting hand exerting unlucres-sure caused it to slip under the duodenum to the left. However two more stones lying immediately above appeared in the wound and were easily removed. These had undoubtedly been lying along the papilla.

A rubber drainage tube was placed in the gall bladder according to the inversion method. A cigarette drain was put in Morrison's space while a third reached to the site of the pancreatic incision. The incision was closed up to the point of exit of the drains.

Following the operation the pulse increased in frequency and became exceedingly feeble despite vigorous stimulation. Death occurred twelve hours after operation.

A partial autopsy was permitted at which the duodenum and pancreas were removed *in toto*. The specimen was examined by Dr. Charles V. Carosi, pathologist to Fordham Hospital who reports as follows:

Description of specimen. The specimen consists of the head of the pancreas to which the second part of the duodenum is attached. The duodenum was opened; the papilla appeared to be very much enlarged and the tissues around it infiltrated and necrotic.

The common bile duct presents behind the pancreas. It is greatly distended being 6 mm. in diameter. A probe passed through this emerges without difficulty into the duodenum. The duct of Wirsung appears to be patent.

The pancreas itself is of large size and firm with an occasional area of hemorrhage. Section was taken of the papilla and of the hemorrhagic areas and non-hemorrhagic areas of the pancreas.

Microscopical findings. The duodenal mucosa is necrotic. The epithelium of Brunner's glands is largely desquamated. The peritoneum is richly infiltrated with polymorphonuclear leucocytes. The surrounding lymph nodes are infiltrated with polymorphonuclear leucocytes. The common duct shows only edema of its walls and desquamation of its lining cells. In the pancreas one finds first a few areas of cystic dilatation of ducts and around each the seat of a very active desquamation. A cross section of one duct presents an occluding mass of highly refractile bile-stained material. Other ducts are crowded with necrotic cells, polymorphonuclear leucocytes and bacterial colonies.

There are wide areas of pancreatic tissue in which all semblance of acinar arrangement is ob-

scured, hazy consisting of masses of acinar cells in all stages of degeneration in these areas there is no infiltration. In still other areas there are circumscribed foci of polymorphonuclear infiltration which have not as yet undergone liquefaction necrosis. In some of these foci bacterial colonies appear. There are a few areas of fat necrosis. The whole section presents evidence of moderate fibrosis.

Diagnosis Suppurative pancreatitis, probably following a catarrhal inflammation, because of obstruction of ducts, the bacterial invasion coming from the duodenum via the duct. Such an occurrence is rendered probable by the finding of bile stained material within the small ducts of the pancreas.

Conclusion This operation demonstrated that it is feasible to remove calculi from the ampulla of Vater by direct attack through the head of the pancreas. An investigation of the literature was undertaken to discover if this particular operation had ever been performed before. It was found that the operation had been performed by Tansini, Terrier and MacGraw in order mentioned chronologically making a total of 3 cases. In all these the operation was employed as a method necessitated by the peculiar anatomic or pathologic conditions existing at the time. The three cases are detailed here for the sake of completeness. Kehr states that Keen successfully reached and extracted calculi through the head of the pancreas. A search of the literature fails to find this reference.

Stefan's case reported by D. Esté. The patient was a woman presenting the classical symptoms of stone in the common duct. An oblique incision was made, parallel to the right costal border. Very dense adhesions existed between the hepatic flexure, the great omentum, the superior angle of the duodenum, and the margin of the liver. The exploration proved difficult. After separating the adhesions at the edge of the liver the gall-bladder was isolated and a calculus removed. Catheterization of the biliary duct was impossible. No guide or probe could be passed. The gall bladder was removed. An effort was made to free the common bile-duct at the level of the foramen of Winslow. The reporter states that Stefan discussed with the students present in the amphitheater the advisability of retroduodenal exposure of the bile-duct, but ultimately decided that it was impossible of execution. The reason is not stated but probably the adhesions prevented. On the same ground most likely he did not employ a duodenotomy. In the angle between the superior mesenteric vein, the head

of the pancreas, and the duodenum, the operator felt an abnormal resistance, deeply situated. Grasping the pancreas with forceps and lifting it up he discovered that the pancreas presented the signs of chronic inflammation with sclerotic changes. An incision was made over this mass. The common bile duct was isolated. It was dilated and at the point of entrance into the duodenum was a swelling within the lumen. An incision was made into the common bile-duct at the site of the calculus, which incision involved slightly the outer coat of the duodenum. The inferior pole of the calculus lay in the intraparietal portion of the common bile-duct. Sutures were introduced before the removal of the stone which was firmly adherent to the wall of the duct. Some turbid bile followed the removal of the stone. Retrograde catheterization failed to disclose the existence of additional calculi. Lembert sutures were applied to that portion of the duodenum involved in the incision. Double drainage was instituted. One tube was placed in the cystic duct a second in the common bile-duct and the third passed down to the bed of operation. The wound was then closed. The drainage was excellent. The cystic duct fistula closed rapidly. The common bile duct fistula took a long while to heal, though ultimately complete closure occurred. The patient made complete recovery.

Terrier's case Biliary lithiasis cirrhosis hepatoduodenotomy death. The patient was a man 32 years of age. Vertical incision about ten inches along margin of abdominal rectus, on right side exposure of peritoneum. The transverse colon which was adherent to the lower surface of the liver was detached and turned down but the gall-bladder could not be found. Imbedded in the head of the pancreas, a stone could be distinctly felt evidently in the choledochus. Unsuccessful attempts were made to crush this calculus and to push it toward the intestine. Placing the fingers of the left hand a little behind and below the head of the pancreas, the operator cut down directly upon the calculus and opened the choledochus. The stone was then removed. It was roughened, of oval shape 1½ inches long and ½ inch wide. Catheterization of the choledochus served to show its permeability. The canal above and below the incision which had been applied for the withdrawal of the calculus. Suture of duct. Large drainage tube under the lower surface of the liver near the hilus. Operation lasted about one hour and a half. Death on second day following the operation. Autopsy showed that the incised ampulla of Vater was completely closed by the sutures. The duct which extended from the pancreatic incision to the abdominal wound contained a little blood stained fluid.

MacGraw's case The patient was a woman, 36 years old. The chief complaint was jaundice of five months duration, associated with abdominal pain. A right rectus incision showed an enlarged liver. There were no stones in the gall-bladder cystic or common ducts. A large hard tumor was

felt in the head of the pancreas. The pancreas was incised carefully and deliberately the common bile-duct was exposed opened and the gall stones easily expressed. The pancreas substance at the side of the incision was $1\frac{1}{2}$ inch in thickness and relatively vascular. There was only a moderate flow of bile. The stone was round and measured 2 inches in circumference. The pancreatic wound and the common bile-duct were sutured with kangaroo tendon. A rubber drainage tube was inserted and the wound was partially closed. Recovery.

In order to determine the usefulness and practicability of this transpancreatic approach to the common bile duct the author reproduced the operation in the anatomical laboratory of Fordham University Medical School.

In a male cadaver the supraduodenal part of the common bile-duct was incised and two leaden shots introduced and pushed down to the end of the common duct in order to simulate the operative findings. The quadrilateral described by Quénu was easily recognized. The second and third finger of the left hand were placed behind the second part of the duodenum while in front the thumb of the left hand acted as the palpating finger. The shot could be easily felt. By flexion of the second and third fingers and an upward pull the *entire anatomic mass* lying upon these two fingers was lifted up and brought forward. This rendered the pancreas quite accessible. The pseudocalculi were again palpated and with the pancreas parenchyma lying over them were brought forward. A pair of blunt pointed scissors tore through or dilacerated the pancreas and exposed the terminal part of the common bile-duct immediately before its junction with the duct of Wirsung. The common bile-duct was then nicked longitudinally and the shot exposed. They were easily expressed. The common bile-duct was recognized by the dark color it presented in contradistinction to the white pancreatic tissue. The technique proved simple and this particular cadaver demonstrated the feasibility of removing a leaden shot from the terminal part of the common duct by incising its wall through a preliminary incision in the head of the pancreas without injuring the duct of Wirsung. Following the

operation the duodenum and pancreas and the common bile-duct were removed *in toto*. A careful dissection subsequently showed that the duct of Wirsung was patent intact and uninjured.

The occurrence of injury to the canal of Wirsung during pancreatic operations causing troublesome lithiasis is probably extremely exaggerated. La Courte and Charbonnel collected sixteen cases of pancreatic lithiasis which had been subjected to operation. There were three immediate death following exploratory incision and two deaths occurring within a few days. Allen's patient died at the end of the fifth day. Two pancreatic calculi were removed from a pancreatic cyst situated between the liver and the stomach. In Pearce Gould's case death occurred on the eleventh day. A stone had been removed from the canal of Wirsung. Autopsy showed multiple calculi in the pancreas associated with a hydatid cyst of the liver. In the remaining cases subjected to operation which recovered no mention whatsoever is made of the occurrence of pancreatic lithiasis.

In passing it may be mentioned that Cherecellis has performed experimental suture of the duct of Wirsung. It is a feasible operation. However from a study of the above cases of pancreatic lithiasis there is slight occasion for fear of the development of troublesome complications if the duct be accidentally divided. As to the possibility of injury to the duct of Santorini very little is known.

The lesser duct lies as a rule on a plane central to the main duct. As to the result of its division the writer is unacquainted with any clinical or experimental reports which would throw light upon the question. It is extremely probable that its division accidental or deliberate would be negligible.

The anatomical researches of Baldwin afford valuable information in this respect. He found that in 13.2 per cent of the cadavers (10 out of 76 specimens) the accessory duct failed to join the main duct in 86.8 per cent of the cases (the remaining 66 specimens) junction was effected with the main duct in the head of the gland close to the neck. We see therefore that in 86.6 per cent of the

cases the accessory duct has two terminations. It seems natural to conclude that the division of its duct in any part of its course would not lead to either obstruction or leakage of the pancreatic secretion. The occurrence of hemorrhage might be claimed as an objection to the employment of the transpancreatic route. In the cases of pancreatic calculi, this objection does not exist, for it has been shown by LaCoutre and Czerny that pancreatic stones tend to exteriorize themselves and push back the pancreatic tissue so that the covering layer becomes quite thick and relatively anemic. It is possible that this process takes place in the case of biliary calculi. The investigations of Quénu mentioned above, as to the relative thickness of the pancreatic tissue situated in front of the common bile-duct should be kept in mind. This pancreatic crust is so thin that it would appear that no extreme amount of pressure is needed to make it relatively anemic. Moreover the writer's personal operative experience did not demonstrate the occurrence of hemorrhage, and the cases of Tansini, Terrier and MacGraw do not lend any support to those who would object to this operation on the ground of troublesome hemorrhage.

It should be recalled that an incision of the pancreas in this particular region has been warmly recommended by Vautrin for the treatment of chronic pancreatitis. He advocates the division of the collar of pancreatic tissue which compresses the common bile-duct. This operation has been employed by Vautrin, Martino and Czerny. No mention is made by Vautrin of these surgeons meeting hemorrhage in performing this type of pancreatotomy.

These three objections, injury to the duct of Wirsung, pancreatic fistula, and the occurrence of severe hemorrhage seem to lose in strength when the anatomy of the pancreas and the clinical reports of pancreatic operations are carefully studied. That these objections are real, no one can doubt. That they are valid, is open to question. Nevertheless, these objections are sufficiently real and strong to prevent the selection of the transpancreatic route for impacted calculi,

when the retroduodenal or transduodenal routes are available. However if these routes are impracticable owing to complications, such as occurred in the writer's case and in the cases of Terrier, Tansini, and MacGraw where the adhesions were extensive the operation of transpancreatic choledochotomy has a definite field of usefulness.

The advice of a surgeon in regard to a technical procedure naturally rests ultimately upon the great familiarity of the surgeon with that particular operation. Many operations can be based on *a priori* anatomical, technical and physiological grounds, and the real test is a definite practical experience on the living. For example the extreme intestinal distention of acute pancreatitis may render a certain operation impossible or on the other hand, in a thin, wasted, and emaciated patient, with collapsed intestines, the technical difficulties are diminished.

If one were certain of the calculus being lodged in the lower portion of the pancreatic part of the common bile duct, an incision directly backward into the pancreas might be indicated. If the calculus were partly in the intraparietal part of the common bile-duct, the stone could be reached by an oblique route through the head of the pancreas, approaching the upper part of the calculus so as to come upon it from above downward thereby guarding against injury to the duct of Wirsung.

It may be difficult to determine whether a part of the calculus rests in the common duct or whether it lies completely within the wall of the duodenum. The danger of leakage from the intestine seems remote so long as the papilla is intact. The opening through which the stone is removed is exceedingly small.

The operation of transpancreatic choledochotomy is presented for consideration as a measure of occasional applicability and usefulness. The writer has no intention to urge or even to suggest that this operation be used to supplant the older procedures now in vogue.

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EXCISION VERSUS GASTRO-ENTEROSTOMY

By VAN BUREN KNOTT M.D. St. City Iowa

SURGEONS of experience have long since recognized the value of gastro-enterostomy in the treatment of gastric and duodenal ulcer. When the indications for its performance are present and when done by competent hands the results following this operation have justified the confidence with which it has been so frequently employed. It must be admitted however that like many other surgical procedures which have been popularized by competent men it has been too frequently employed when sufficient indications for such employment did not exist.

It is a well established fact that a gastro-enterostomy made in the absence of well defined and understood pathological conditions involving the stomach or duodenum or both will prove worse than disappointing. Yet far too many operations are being performed by surgeons who open the abdomen expecting to find an ulcer and who failing to find one can think of nothing else to do than the gastro-enterostomy which they had decided one or two days before was the procedure necessary in that particular instance. The value of any surgical procedure cannot be determined by men not qualified or by the recital of experiences in which such procedure is clearly contra indicated.

Therefore we may assume that it has been the abuse of gastro-enterostomy rather than its proper and rational application which has brought it more or less into disfavor.

It is with full appreciation of the value of gastro-enterostomy when properly employed that I protest against its employment in every case of ulcer treated surgically.

Statistics now available from many large clinics prove most conclusively that in approx-

imately 70 per cent of patients afflicted with cancer of the stomach it is implanted upon an old ulcer base. It is recognized that the tissue changes which accompany chronic gastric or duodenal ulcer are more or less permanent and potentially cancerous. Rodman recognizing this years ago recommended that where the pyloric region was the seat of an ulcer or ulcers which presented much thickening or other evidences of malignancy a pylorotomy be performed and this principle for ulcers so located has been more or less generally recognized and employed.

It would appear however from a perusal of literature pertaining to gastric surgery and from impressions gained in attendance at various clinics that ulcers situated in other regions of the stomach than the pylorus are not excised as frequently as they should be. With the tendency to cancer development upon an ulcer base regardless of its location in the stomach wall the duty of the surgeon toward these patients is clear.

Ulcers so situated as to permit excision without particularly increasing the immediate risk of the operation should be excised. Moynihan (1) states that in reviewing his early work when gastro-enterostomy alone was employed in the surgical treatment of ulcer about one third of the number of patients only could be pronounced 'cured'. Another third after a varying period of freedom from symptoms had to submit to a second operation in which a pylorotomy or excision of the ulcer was rendered necessary after which they experienced lasting relief. The remaining third developed carcinoma of the stomach from two to five years later.

His experience which parallels that of many other surgeons furnishes additional reason

for the more radical treatment of ulcer at the primary operation. The fact that one third of the number of patients with gastric ulcer who have been treated by gastro-enterostomy alone by a master of gastric surgery require a second operation for the removal of the ulcer before obtaining complete relief from distressing symptoms, should command our earnest attention.

Because of the rich blood supply and thickness of the stomach walls, the repair of a wound therein is rendered not only extremely easy of accomplishment, but practically certain as to prompt and firm union. Ulcers situated upon the anterior surface of the stomach and not involving the curvatures may be very readily excised and should in practically every instance be so treated.

Ulcers located in the pyloric region upon the anterior wall may as a rule be readily excised and should such excision result in narrowing of the pylorus a gastro-enterostomy should also be made. If several ulcers are present in this region or if the thickening and induration attending one ulcer are extreme a pylorotomy or Rodman operation should be done. Pylorotomy is a somewhat more formidable procedure than simple excision or excision and gastro-enterostomy and should be reserved for those cases where pyloric involvement is general and extensive.

Ulcers involving the lesser curvature may be excised by the method of Moynihan (2) followed by gastro-enterostomy which he states should always be done in such cases following excision because of the resulting stomach deformity. It is surprising what results may be secured by this method in ulcers involving so much tissue on either side of the curvature as would appear at first sight to render their complete removal out of the question. However many ulcers so situated will be encountered whose complete excision is out of the question because of adhesions and extensive involvement of the stomach wall, and in such instances we are forced to be content with gastro-enterostomy.

Ulcers upon the posterior wall of the stomach may be excised if not too adherent,

either by employing the rotation method of Summers (3) or the transgastric method advocated by Chaput (4) Deaver (5) and others. I have employed both of these procedures with much satisfaction and have been surprised and gratified with the ease of their performance in suitable cases. Because of adhesion or inaccessibility not all ulcers of the posterior wall can be excised and a gastro-enterostomy must suffice.

Ulcers high in the cardiac end of the stomach are not amenable to excision nor are they benefited by gastro-enterostomy. Jejunostomy offers the best prospect for relief to patients so afflicted.

When operating for perforation of a gastric or duodenal ulcer excision of the tissue involved in the ulcerative process should be done whenever possible before attempting to close the rent in the stomach wall. This removal of diseased tissue not only facilitates immediate wound repair but also lessens the tendency to recurrence.

Whenever possible after excision of an ulcer or ulcers the suture line should be reinforced by an omental graft or flap as long ago recommended by Senn, as thereby the danger of leakage is reduced to the minimum.

As experience increases it will be found that more and more ulcer bearing tissue may be treated radically by excision even to the point of making when necessary a partial gastrectomy for ulcers so situated as to require the same for their removal.

Gastro-enterostomy may frequently be necessary as a supplementary procedure to excision of ulcers wherever situated and should in such instances never be neglected. Believing that the ulcer of today is the cancer of tomorrow it is urged that in every suitable case the ulcer bearing tissue be removed by whatever means or method is in that particular instance most safe and practical.

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THE ADVANTAGE OF SEPARATE SUTURE OF THE MUCOUS MEMBRANE IN GASTRIC SURGERY¹

BY RICHARD A. BARR, M.D., FAC. NATIONALE T. S. I. E.

It has unfortunately been proved to the satisfaction of most observers that simple gastrotomy with its low mortality (15 to 20 per cent) will be definitely curative in less than half the cases of chronic gastric ulcer and in hardly more than two-thirds of the cases of chronic duodenal ulcer that come to operation.

That many ulcers do not yield to medical treatment and yet are permanently and completely cured by surgery (simple or complicated) is a fact firmly established as that gastrotomy is not a cure all. More than this, that properly applied surgery can cure every existing ulcer of this region is a reasonable expectation, though the cure may be effected at a great risk.

Leaving out all consideration of cancer, actual or potential, the cure of ulcer by surgery can only be positively assured by resection or permanent exclusion of the involved area. Drainage and the admission of alkaline secretions into the stomach may give temporary relief of symptom. This may be and often is accomplished by gastrotomy. An opening at the usual site of the posterior gastrotomy does under some conditions (pylorospasm for instance or in case of very large stomach) hasten the emptying of the stomach and does admit the bile and pancreatic juice into the stomach. Animal experiment, X-ray observations and average clinical results all go to prove, however, that to act advantageously a moderate sized artificial opening must be assisted by spasmodic or organic closure of the pylorus. Nature ignores to a greater or less extent the artificial opening unless obstruction exists at the natural one. This is an established fact and many ills besides recrudescence of ulceration result from the presence and disuse of the new opening.

My own idea of the proper way to view a gastrotomy is merely as a new channel for food. This new channel is necessitated

by reason of the fact that (a) traction or operation has caused closure of the pylorus. In other words, it bears somewhat the same relation to the urgency of ulcer of the stomach and duodenum that does mydriasis to the urgency of cancer of the rectum.

To exert its definitely curative influence on an ulcer of the stomach or duodenum, surgery must either remove the ulcer or exclude the area occupied by it not only from the passage of food but even from contact with the acid gastric secretion.

These objects can be accomplished in duodenal ulcer by closure of the pylorus, in pyloric ulcer by pylorotomy or closure on the proximal side in all other by resection of more or less of the stomach including the pylorus in suitable cases. Where the resection does not include the pylorus, it might be wise at least to occlude it for prophylactic purposes. The reasonableness of this would be more assured if we knew the etiology of ulcer more definitely. However, prompt emptying of the stomach and the admission of alkaline secretion are doubtless beneficial (experimental ulcer cannot be produced in the absence of acidity) and these can be assured by gastrotomy when done as an adjunct to pyloric closure.

This statement of the case sounds extreme and yet if we are to do anything definite for non-perforating and non-tenacious ulcer, this is almost the irreducible minimum. Fortunately most ulcers are so situated that closure at or near the pylorus will meet the indication. When pylorotomy or resection elsewhere is required, the surgical risk will not be out of proportion to that of the pathology.

In doing the limited work I have had in stomach surgery I have been torn between the conviction that only radical measures would get result, and the fear of the mortality associated with these radical measures.

The technical difficulties of resection of the

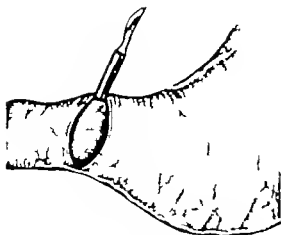


Fig. The posterior surface is freed by blunt dissection with narrow knife handle or similar instrument.

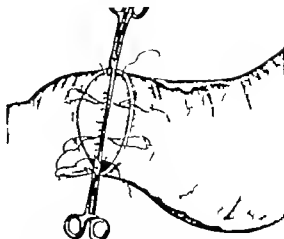


Fig. Showing the ligatures of the mucous membrane about clamp.

stomach are not a negligible matter to the surgeon who does not do stomach operations every day. The satisfactory application of clamps, the thickness of the stomach-wall, and the exposure of the inner surface of the mucous membrane have been among my greatest difficulties in doing the technique as I think it should be done. By splitting the stomach wall so to speak, and using the mucous and submucous coats as one layer and the serous and muscular coats as another I have avoided these difficulties to an appreciable degree. This technique has been used to a greater or less extent by others but I do not believe its advantages have been duly appreciated.

This use of the mucous membrane is most satisfactory in occluding the pylorus. For this purpose an incision is made on the anterior surface of the stomach, or of the duodenum according to conditions. This incision is carried down to the submucosa which in all succeeding description will be included in the term mucous membrane. The incision should be preferably transverse to the long axis of the organ and should extend from border to border.

When the mucous membrane is reached the overlying tissues are removed from its anterior surface for at least an inch, and for as much more as may be desirable. Then the posterior surface is freed by blunt dissection with a narrow knife handle or some similar

instrument (Fig 1). A cylinder of mucous membrane is thus gotten up which is clamped at its center. The mucous membrane is closed just on either side of the clamp by a chain ligature of linen tied in two or more sections as required by the width of the cylinder of mucous membrane (Fig 2). The clamp is then removed and the mucous membrane divided along the groove left by the clamp.

When the length of the cylinder of mucous membrane permits double clamping with incision between the clamps, this should be done as it simplifies suture or ligation of the stump. When double clamping is done, I always prefer suture to ligation and use linen which is put in with two needles just under the clamp after the fashion of a harness stitch (Fig 3).

As the next step of the operation a purse string of catgut or linen is thrown around the base of each stump (Fig 4). This purse string is put in the angle of tissue where the exposed mucous membrane terminates, and it may be placed in the mucous membrane itself but preferably should be in the muscular tissue. The stumps are inverted and the purse string tightened. When the width of the stomach makes a purse string undesirable as may readily happen on the proximal side a continued suture approximating the anterior and posterior walls in the inner surface of the overlying muscular coat will serve the

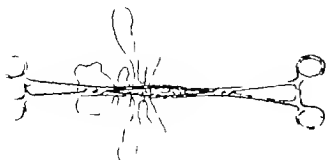


Fig. 3. Showing method of suturing back of wall to double clamp the gland of mucous membrane.

same purpose. The seromuscular tissues are then closed, the edges of the wound being inverted so as to bring the peritoneum in contact with the muscle of the posterior wall or the edges of the seromuscular wound may be brought together by sutures which also catch the posterior wall.

Instead of inverting long stump of mucous membrane the stumps may be ligated (or preferably sutured) close to their bases and then cut short. This makes the inversion less satisfactory but is necessary when on account of the location of the ulcer the dissection has to be carried across the face of the ulcer leaving possibly an opening in the membrane corresponding to it. Inversion of the stump gives an additional sense of security and yet is probably not of any special value provided the mucous membrane is trimmed short.

When the ulcer is of suitable size and located on the anterior wall it may be surrounded by crescentic incisions running from curvature to curvature down to but not through the mucous membrane and the dissection and ligation of this structure completed as just described (Fig. 5).

It would appear at first glance that an incision in the long axis midway between the border would be most satisfactory but there are several objections to this. First the ulcer would be more difficult to avoid or to include by encircling. Then the closest attachment of the overlying structures to the mucous membrane is found at the borders and here we get the most hemorrhage in separating them. At the extremities of the transverse incision we have immediate access to these

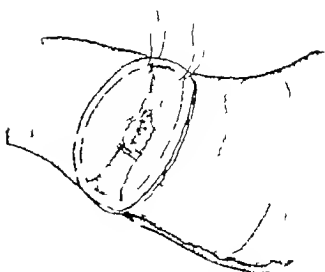


Fig. 4. A ligature suture of the ulcer in the anterior wall and the seromuscular wall.

border and also to the posterior surface of the mucous membrane.

In doing this little operation it will not usually be necessary to ligate the omentum at the upper and lower borders of the viscus but this can be done if hemorrhage is at all troublesome.

The advantage this method of occlusion has over the Biondi method and various other methods with or without dissection of the mucous membrane is that it is more apt to be permanent, and is equally as simple as any except the ligature methods which are least reliable.

The advantage of the procedure over von Eiselsberg's exclusion is that the omentum does not have to be divided and the pylorus does not have to be mobilized. Further than this the cavity of the viscus is not opened up and the inner surface of the mucous membrane is not exposed to the same extent. Closing a seromuscular wound on the anterior surface of the stomach or duodenum is a very much less difficult job than closing the two openings left by division of all tissues.

There is small choice in technical difficulty between unilateral exclusion and Rodman's pylorotomy and between these two procedures I would choose pylorotomy. The only advantage the procedure just described has over pylorotomy is that it is more easily performed and it serves almost the same



Fig. 5 Method of resecting an ulcer of suitable size on the anterior wall.

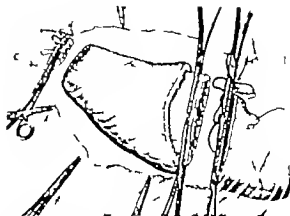


Fig. 6 Showing technique used in pylororectomy

purpose so far as getting rid of the ulcer and cancer bearing area is concerned for the pyloric mucous membrane is removed. It can be made a submuscular resection of the ulcer and cancer bearing and even of what, according to recent teaching is the acid producing area of mucous membrane.

Should the location and extent of the ulcer at or near the pylorus or the presence of adhesions prevent the use of this technique and yet cicatrization should not have produced an efficient and permanent stenosis, pylororectomy at some later date primary or secondary to the gastrojejunostomy is of course indicated.

In doing pylororectomy the mucous membrane can be handled in much the same way as just described. After the omenta have been tied and you are ready to divide the viscera, with or without clamping the duodenal end of the area to be resected, cut down upon the mucous membrane anteriorly and posteriorly and dissect up a short area of it as already described for pyloric occlusion. Double clamp this mucous membrane cut between the clamps, suture or ligate the distal end (Fig. 6) and then suture the seromuscular structures over this stump inverting the serous coat carefully.

The incision through the stomach at the opposite end of the resected area is handled in the same way (Fig. 6). The mucous membrane is closed by the harness stitch of linen already mentioned which is drawn snug as it

is placed (Fig. 3). The mucous membrane may be sutured close up to its line of reflection from the muscle and cut short, but the overlying structures are more easily and smoothly closed if the mucous membrane is long enough for its suture line not to hold the anterior and posterior stomach walls too rigidly in contact.

I have found this method of closure technically much easier than the ordinary one, and that the line of closure is much smoother and less bulky. Hemorrhage can be accurately and permanently disposed of as you proceed. Rubber-covered clamps may be used for the temporary control of hemorrhage and being used for this purpose alone may be loosened at any time for the detection and control of vessels that would bleed.

In performing gastrojejunostomy I use no clamps except a small Murphy clamp at either end of the proposed incision in the jejunum. It is at times difficult to get room on the stomach for a gastro-enterostomy clamp and once applied the clamps necessitate a blind method of controlling hemorrhage.

In the absence of clamps the viscera are held in contact and supported outside the abdominal wound by sutures which catch a good bite on each organ just beyond the limits of the proposed lines of incision. The incisions are made down to the mucous membrane, and this structure cleared for a space half an inch wide at the center of each in

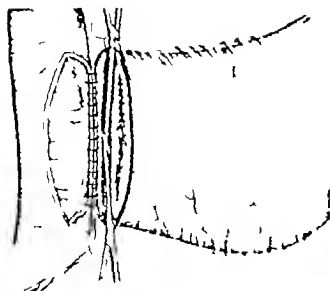


Fig. 6. Cavity of stomach held open by clamps. mucous membrane until posterior seromuscular suture line is completed in gastrojejunostomy.

cision and tapering to the angles. The posterior cut edges of the seromuscular layer are united by a continued suture the mucous membranes are then incised down the center of the exposed areas the cut edges are united all the way round with a whip-over suture and the seromuscular suture completed anteriorly. Catgut is used throughout. The inner layer of sutures placed in this way is a more simple procedure to accomplish than the usual through and through suture the suture line when complete is more flexible and more readily pushed out of the way for the seromuscular suture to follow. A third line of sutures may be used if desired.

If in doing a primary pylorotomy it is considered desirable to anastomose the cut edge of the stomach into the jejunum after the method of Foley the resection of the stomach is carried out as already described. The union between the stomach and jejunum is made as in ordinary gastrojejunostomy (Figs 7 and 8) except that the cavity of the stomach is kept closed by the clamps on the mucous membrane until the posterior seromuscular suture line is completed (Fig 7) and when these are removed by rubber-covered clamps as ordinarily used.

In the *Journal of the American Medical Association* of September 23, 1915 Dr W. J.

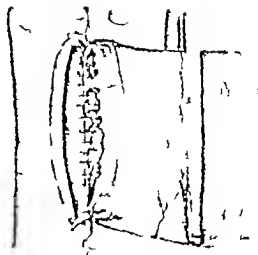


Fig. 8. Posterior seromuscular suture line completed and rubber covered clamps in place.

Mayo described a method of excision of ulcer of the body of the stomach accessible from the serous surface and not extensive enough to demand more radical measure. A seromuscular flap is raised the ulcer ulcerized the opening closed by sutures placed in the mucosubmucous coat and the flap replaced with overlapping. Dr Mayo advises gastrojejunostomy but says that blocking the pylorus has not seemed to have added anything to the operation. He got results without blocking but many of us cannot.

I have been experimenting on dogs with a wire snare for dividing the mucous membrane in gastrojejunostomy after the inner line of sutures has been completed both posteriorly and anteriorly except for the small space required by the snare. The snare has worked very well so far as results in dog are concerned but such a strain is thrown upon the sutures when the tissues are drawn upon during the crushing action of the snare that I have not tried it upon a human subject.

I will say in conclusion that unless you have given the matter special attention you probably have no idea what a tough substantial structure the mucous and submucous coats of the stomach make. The peritoneum and muscle are much more readily divided it is easy to cut down to the submucosa and leave it intact and the overlying structures are readily detached from it.

MELANO-EPITHELIOMA

A REPORT OF SEVEN CASES

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THE variety of synonyms which have been applied to pigmented malignant neoplasmata indicates a lack of uniformity of opinion as to just what these tumors are histogenetically. They have been described as melanosarcomata, melanocarcinomata, melanoblastomata, melanomata, melano-epitheliomata, melanotic sarcomata, and chromatophoromata. The majority of writers utilize the term melanosarcoma which has its basis of usage in the old classifications of neoplasmata. These classifications were founded upon a theoretical conception of the specific origin of tissues in the three embryonic layers. The principal cells of naevi or moles having been thought to have their origin in connective tissue of the skin were therefore mesoblastic and hence their neoplastic derivatives have been called sarcomata.

The conception that the spindle and oval cells which are characteristic of melanotic neoplasmata of the skin are of connective tissue origin is founded upon morphology which

we are rapidly learning is not an accurate criterion for the embryologic origin in any specific embryonic layer. Moreover the direct continuity of the spindle and oval cells with the basal cells of the skin can be readily demonstrated not only in naevi (Fig. 1) but also in melanotic neoplasmata (Figs. 2, 3, 4 and 5).

The cells of the latter condition frequently assume an alveolar arrangement (Figs. 6, 7 and 8) which is very characteristic of epithelial tumors. Such alveolar growths have been called alveolar sarcomata and endotheliomata, the latter term inferring their origin in the lining of vessels. In the authors experience no evidence of vascular structure in connection with the alveolar arrangement has been demonstrable (Fig. 8).

We desire to utilize the term melano-epithelioma for the following reasons:

1. If the old three layer hypothesis for the classification of tumors be adhered to it may be well to remember that the pigment bearing cells of the skin (Fig. 9) and perhaps the choroid (Fig. 10) both of which furnish the source of all of the tumors of this series, have



Fig. (50, 6) A section of mole showing the direct connection between the stratum germinativum and the subepithelial cells which are characteristic of moles.



Fig. (90036) Photomicrograph of an early migration of the malignant cells of the stratum germinativum in the skin of the right labium.



Fig. 3



Fig. 4

The micrograph shows a part of the epithelium of the skin. The cells are arranged in a regular pattern, and the structure is typical of the epidermis. The cells are small and round, and they are closely packed together. The overall appearance is that of a well-organized tissue.



Fig. 6

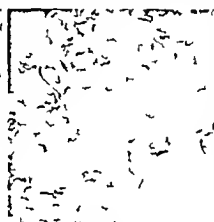


Fig. 7



Fig. 8

Sections 50, 51, 52, and 53 respectively show an alar arrangement of cells.



Fig. 9 (No. 59) Section through skin showing the normal location of pigment cells.

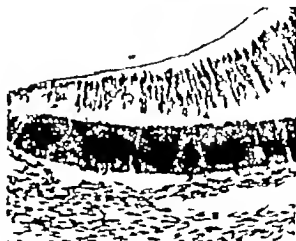


Fig. 10 Section through an embryonic eye showing the relation of the choroid to the retina.

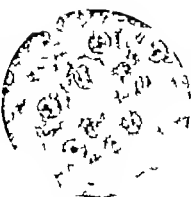


Fig. a



Fig. b

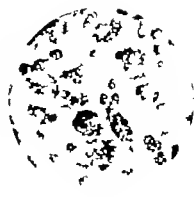


Fig. c

Fig. a, b, c (3563 and 3564) High power photomicrographs showing density of cells which are found in melanoma-epithelioma.



Fig. 2

Fig. 3

Fig. 3

Fig. 4

Fig. 4

Fig. 2 (5793) A flat pigmented mole upon the inner side of right leg; metastasis in the right inguinal glands. Death within year from operation.

Fig. 3 (3385) An elevated, almost pedunculated, pigmented malignant neoplasm upon the left internal malleolus.

Fig. 4 (700) Gross section through malignant

pigmented hairy mole upon the right cheek. The neoplasm has not extended visibly into the subcutaneous tissue.

Fig. 5 (3905) Gross section showing the extension of growth from pigmented mole into the subcutaneous tissue. The growth in the subcutaneous tissue lacks pigment location right leg just below the knee.

Fig. 6 (4370) Metastatic growth of left villary glands

their origin in the ectoblastic layer rather than the mesoblastic layer. There still seems to be, however, some doubt as to the exact origin of the pigmented cell of the choroid, some authorities believing that they are a part of the embryonic optic bulb and other considering them a part of the mesoblastic tissue which lies adjacent to the retina (Fig. 10).

2 The downward growth of spindle and oval cells of moles or *naevi* and melanotic neoplasms are in direct continuity with the stratum germinativum of the skin (Figs. 2, 3, 4 and 5).

3 The pigment bearing cells of normal skin and of the downward growths of moles or *naevi* are in the basal layer (stratum germinativum) and not in the subjacent connective tissue (Figs. 2, 3 and 4).

4 In accord with more recent observations of the histogenesis of epithelial neoplasms they arise directly as a proliferation of the germinative or regenerative cells of the parenchyma of organs and not from either the differentiated cell or from cell rests.

The cells of melano-epitheliomata may be oval (Fig. 11a) or spindle (Fig. 11b); all cells do not contain pigment (Fig. 11 a b c).

In our series of 70 cases the condition arose in both flat (Fig. 12) and pedunculated (Fig. 13) pigmented areas of the skin. The local growth may be discovered when there is no apparent invasion of the tissue subjacent to the pigmented naevus (Fig. 14). In the majority of cases, however, there is extension to the subjacent structures (Fig. 15). The growth may occupy a large (Figs. 14 and 16) or small part of the tumors (Fig. 15).

The pathogenicity of this type of neoplasm may be seen to best advantage in the following tables:

1	Average age of patients 40 years	
	Number patients between the ages of 20 and 30 years	
	Number patients between the ages of 30 and 40 years	
	Number patients between the ages of 40 and 50 years	13
	Number patients between the ages of 50 and 60 years	14
	Number patients between the ages of 60 and 70 years	20
	Number patients between the ages of 70 and 80 years	8
	Number patients between the ages of 80 and 90 years	
	Total	

3	Oldest patient 83 years youngest 1 years	
4	Age of first lesion before amputation 11 years	
5	Number of lesions which had their origin in birth-marks 31	35 (50)
	Number of lesions which had their origin in moles 4	
	Number of lesions which had their origin in freckles 1	
	Number of lesions which had their origin in the skin 1	
	Number of lesions which had their origin in the eye 1	
	Number of lesions which had their origin in the nose 1	
	Number of lesions which had their origin in the cheek 1	
	Number of lesions which had their origin in the chin 1	
	Number of lesions which had their origin in the neck 1	
	Number of lesions which had their origin in the shoulder 1	
	Number of lesions which had their origin in the deltoid 1	
	Number of lesions which had their origin in the hand 1	
	Number of lesions which had their origin in the thumb 1	
	Number of lesions which had their origin in the breast 1	
	Number of lesions which had their origin in the chest 1	
	Number of lesions which had their origin in the back 1	
	Number of lesions which had their origin in the abdomen 1	
	Number of lesions which had their origin in the lumbar region 1	
	Number of lesions which had their origin in the thigh 1	
	Number of lesions which had their origin in the leg 1	
	Number of lesions which had their origin in the foot 1	
	Number of lesions which had their origin in the toe 1	
	Number of lesions which had their origin in the nail 1	
	Total	100

8	Anatomic location of metastases—	
	Regional lymphatic glands	4 (50)
	Crucial	30 (45)
	Liver	20 (30)
	Ovary	1 (1.5)
9	Number of patients the history of previous operation	30
	Number of specimens valued for diagnosis	1
10	Number of correct clinical diagnoses (out of 70 cases)	4 (5.7)
	Number of doubtful clinical diagnoses (out of 70 cases)	18 (25.7)
	Number of incorrect clinical diagnoses (out of 70 cases)	48 (68.6)
11	The number of patients operated on between April 1904 and January 1915 that have been heard from directly or indirectly by letter	35
	The mortality for patients operated on between April 1904 and January 1915 that have been heard from	33 (94.3)
	The number of patients dying within one year from last operation	4 (11.4)
	The number of patients dying within two years from last operation	4 (11.4)

The figure is only approximately correct on account of the patients' inability to remember both the first appearance of moles and slight changes which took place in them.

The number of patients dying within four years from last operation { 6% }
 The number of patients dying within eight years from last operation { 6% }
 Dead date unknown. { 7 9% }

T tal

33

The number of patients operated on between April, 1904, and July 95 that have been heard from and re living

yes from last operation { 5 3% }
 cars from last operation { 6% }
 3 years from last operation { 5 3% }

T tal

5 (3 3%)

Dead 1th metastasis at end of year after operation 3

Dead 1th metastasis at end of years after operation 4

Dead with metastasis at end of 4 years after operation 4

Dead 1th metastasis, date unknown

Dead (about demonstrable metastasis at last operation

t end of year

Dead without demonstrable metastasis at last opera

tion at end of 8 years

Dead (about demonstrable metastasis at last opera

tion date unknown

Dead with demonstrable metastasis at last operation

so out of 33 87 9%

First year deaths with demonstrable metastasis 3

out of 24 95 8%

Living with demonstrable metastasis at last opera

tion t end of year

Living 1th demonstrable metastasis at last opera

tion at end of years

Living without demonstrable metastasis at last opera

tion t end of year

Living without demonstrable metastasis at last opera

tion t end of 3 years

Average duration of life after last operation, months

3 day

The conclusions which may be drawn from the

above-mentioned facts are

1 The so-called melanosisarcoma should

be called properly a melano-epithelioma when

such a condition arises in the skin.

2 The condition arises as a migratory

hyperplasia of the basal (regenerative or

germinative) layer of the skin and invades

the subcutaneous tissues and distant organs

as pigmented and non-pigmented oval spheri

cal or spindle cells all of which cells are fre

quently found in the same specimen or even

in the same microscopic slide.

3 The evolution of such neoplasms in

regenerative cells corresponds to the evolution

of cancer in the skin mammary gland,

prostatic gland and stomach.

4 The alveolar arrangement of cells in

This case possessed melano-epithelioma or melanosisarcoma both

had areas in the choroid

This figure includes the eye case which lived eight years after

operation

this series shows no evidence of any relation to vascular endothelium

5 The condition is one of middle life although it may be found from childhood to old age

6 An attempt at determination of the exact duration of the condition from its onset to a fatal termination has failed in this series.

7 There is no specific region of the skin which seems especially predisposed to the development of melano-epitheliomata unless it is on the lower extremities which in this series form the greatest frequency of location

8 Naevi certainly predispose to the development of the condition

9 Metastasis is usually to the regional lymphatic glands.

10 From an economical or practical standpoint melano-epitheliomata which arise in the skin have a high mortality

11 Melano-epitheliomata or melanosisarcomata arising in the eye have a much better prognosis than melano-epitheliomata arising in the skin

12 From a therapeutic standpoint the pathologic history of melano-epithelioma clearly points to the necessity of an early diagnosis and a radical removal of the primary lesion and regional lymphatic glands.

13 From a prophylactic standpoint pigmented areas of skin, such as warts and naevi should be removed when these are in locations which are or have been subjected to injury

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Giant Ureteral Calculus—Anomalous Development of the Genito-Urinary Tract

JOSEPH ABELL, M.D., F.A.C.S., F.R.C.S., F.R.C.P.

THE following two recently observed cases seem to possess sufficient interest to warrant detailed report, the first because of the size of the ureteral calculus which was removed, the second on account of the anomalous development of the genito-urinary tract.

CASE 1. T. E. B., male, white, age 38, occupation linotype operator. Date of admission August 1, 1911. The patient presents a negative personal history of any acute or chronic illness and also of neural infection. He applied to his physician for relief of pain in his back which had then been present for about ten days. He stated that he had felt a dull pain in the left lumbar region at the age of 25 that it had recurred at frequent intervals during the next three or four years, that it then became more irregular. At the age of 25 pain of similar character was felt in the right lumbar region. Since then the attack has appeared in the average of once per month. The pain has never been sufficiently severe to require the administration of an opiate to secure relief and until the present attack had not persisted longer than one or two days. Relief was usually obtained by rest in bed supplemented by a hot bath or the application of a hot water bottle. He also stated that except in the last attack relief from pain was always secured by indulgence in sexual intercourse. Between attacks the urinary frequency was four to five times daily, during an attack once to twice daily. Blood had been noted in the urine on a number of occasions. The present attack of pain began ten days previously and had continued without remission.

Examination. Patient rather thin but well developed and muscular, pulse 100, temperature 100.2, F. heart and lungs normal, right kidney easily palpable, enlarged and quite tender, apparently being a large to a medium-sized grapelust. The left kidney was not palpable and there was no tenderness on that side. The urine was muddy in color and in reaction specific gravity 1020. It contained a marked trace of albumin, occasional blood and pus-cells, calcium oxalate crystals, amorphous phosphates, a moderate number of bacteria.

Cystoscopy revealed a practically normal bladder. The left ureteral orifice was normal in appearance and easily admitted the catheter which was introduced without difficulty into the renal pelvis. The orifice of the right ureter was edematous and two and one-half centimeters from the entrance the catheter encountered an obstruction

implying even the likelihood that it was the result of the sound with the calculus. Urine from the left kidney was obtained by albumin catheterization of the present (left) ureteral orifice. The blood count normal.

Radiograph of the present (left) ureteral calculus in the pelvic portion of a hydronephrotic right ureter, a 1.5 cm. diameter, while the right ureter joined the main duct. Diagnosis: bilateral ureteral calculus with right renal hydronephrosis.

Operation. August 1, 1911. Genito-urinary incision, were made upon both sides, each being enlarged downward by incising the rectus sheath. The peritoneum was displaced medially and the ureters exposed, stripped of their peritoneal covering. Considerable fibroplasia on the right side was found about the right ureter and it was separated with difficulty from the surrounding structure. It was incised at a point corresponding to the brim of the pelvis and the calculus removed by traction. A similar procedure was employed upon the left side, both ureteral incisions being closed by interrupted sutures of gutgut. A large external wound was drained with a small strip of rubber tubing.

The post-operative course was uneventful, the patient returning to his work at the end of the third week. The calculus removed from the right ureter was oblong in shape with a blunt beak or curve at either extremity, it measured 5 cm. in length, 1 cm. in circumference at its largest part and weighed 4 grammes. The left stone was more oval and weighed two grammes. The small calculus was composed of carbonate of calcium, the larger one was phosphatic in character.

The points of interest aside from the size of the calculus are bilateral pelvic ureteral calculi, an absence of colic indicating ureteral descent, the symptom being due to urinary retention with hydro-ureter and hydronephrosis, the possibilities of intra-ureteral calculus, growth on lodged nuclei of renal origin, an absence of bladder frequency or pain with practically normal appearance of mucosa and the fibroplomatous thickening around the pelvic portion of right ureter comparable to the induration observed in the fatty capsule of the kidney in calculous disease of long standing.

Desguin describes a male of 34 who had suffered from paroxysms of abdominal pain



Fig. 1. Calculi, actual size, Case 1. Larger one 5 cm in length 7 cm. in circumference, eight 24 grains.

since his fourth year. The patient was observed in an acute attack, and the diagnosis was between appendicitis and ureteral calculus. Abdominal incision to right of the rectus muscle, right ureteral calculus removed irregularly triangular in shape 26 by 23 mm and weighing 10 grammes.

Baker refers to a male of 24 by whom he was consulted because of supposed prostatic disease which improved under appropriate treatment, although pus in the urine persisted. An attack of ureteral colic two months later was attributed to extension of infection but radiography revealed a concretion just above the vesico-ureteral orifice. A ureteral calculus weighing 94 grains was removed by operation.

Parker performed suprapubic cystotomy and removed a ureteral calculus weighing over three-fourths of an ounce. The patient had complained of no urinary symptoms at any time, the inconvenience suffered being referred entirely to the rectum through which the calculus was originally felt.

Bovée removed an unusually large ureteral calculus by transperitoneal ureterolithotomy. The stone measured 2.75 by 1.75 by 1.15 inches and weighed 1310 grains. It was kidney shaped, one extremity larger than the other, grayish in color with rough surfaces.

Two cases of giant calculi are reported by Buerger. (a) A male of 26 presenting indolent symptoms. Enormous ureteral calculus hydro-ureter, ureteritis, ureteral stenosis, hydronephrosis. Calculus more than four inches in length, with a bulbous extremity pointing downward at level of the spine of the scilum. The shape was sinuous, varying from 6 mm to about 1 cm in diameter.



Fig. 2. Diagram of Case 2 showing large stone filling pelvic portion of right ureter, catheter in left ureter, the stone in pelvic portion of ureter.

(b) A male of 55 urinary symptoms ten years duration. Enormous ureteral calculus hydro-ureter, hydronephrosis. Calculus irregularly ovoid with one pointed extremity measuring 2.125 inches in length by 1.125 inches in width at its superior pole.

Specklin describes a male of 48 from whom an enormous left ureteral calculus was removed. Urinary symptoms of many years duration. Nephrectomy and ureterectomy. Curved or elbow-shaped calculus weighed 51 grammes, 11 cm long from end to end, total length along outer curve 12 cm, knob-like projection in upper portion of middle third. In the literature he was able to find the following ureteral concretion of similar size: Federoff, length 19 cm, weight 52 grammes; Rovsing, length 18 cm, width of a bean; Israel, two cases, (a) length 13 cm, circumference 9 cm, weight 54.4 grammes; (b) length 17 cm, circumference 9 cm; Pozzi, weight 34.5 grammes; Lloyd, length 5.2 inches, circumference 2.4 inches.

In a case recorded by Morris the calculus was nearly six inches in length, in one of Gibbon's cases the stone was half an inch in diameter and nearly round.

CASE. P. G. female, white, age 9. Date of first observation September 3, 1905. The patient had been married three years, but had never

beer pregnant nor had he ever menstruated. There was no history of acute illness until the present. Ten days previously he had an attack of acute pain in the lower abdominal region, relieved by nausea and vomiting. The abdominal examination was indistinct and tender, the temperature varying from 101 to 102. The pulse was 110 to 120. The lesion was regarded by the attending physician as appendicitis. At the end of a week the symptoms had practically subsided and he was discharged.

On September 1 the patient experienced another attack of acute abdominal pain which was also accompanied by nausea and vomiting and he was admitted to the St. Joseph Infirmary. September 3, with a pulse of 120 and temperature 101. Her abdomen was found markedly distended and exquisitely tender, especially over the lower zone. While her figure was typically feminine with well developed mammae and wide pelvis, examination showed absence of the inguinal lymph nodes, the external genitalia were normal in appearance. The urethra admitted the index finger without entering the bladder, pinched with high intensity. Rectal examination revealed an exquisitely tender pelvic mass located high in the left iliac fossa. The urine was sterile, the sediment was a trace of albumin, light sediment with a few red blood cells and rod shaped bacteria. The blood count showed hemoglobin 60 per cent, white cell 10,500 with polymorphonuclear neutrophils 85 per cent.

From the history and the physical findings the most probable explanation of the pelvic mass was thought to be retention of menstrual secretion. Acting upon this hypothesis the abdomen was opened in the median line and the tumor found to be a pelvic kidney situated in front and to the left of the aorta and sacrospinous ligament. Examination of both lumbar regions revealed no evidence of a second kidney. No uterus, tubes, ovaries, nor remnants of the same could be detected. It was evident from the operative findings that the lesion was a pelvis in the single pelvic kidney. The subsequent treatment consisted of the ordinary measures employed in such cases.

Three weeks later catheterized specimens of urine from the ureter and the bladder were found negative upon culture. Radiography after injecting the bladder and kidney with dilargol showed the renal pelvis practically normal in size and shape, with one ureter which was between three and four inches in length. The ureter entered the bladder in the usual situation. No evidence of a right ureteral orifice could be found. A cystogram with the bladder in moderate distention showed that it pressed upon the kidney and that the latter produced a change in the contour evidenced by variation in the normal round outline. The rectum was normal in the right side of the pelvis and after being filled with barium was readily observed in the X-ray plate. Subsequent reports indicate that there has been no recurrence of the pelvis.

Under claim that congenital absence of the kidney is an exceedingly rare anomaly, infantes one case of this character. By various available figures in 1909, utopias the occurrence of congenital single kidney was one in 1,841. Since the publication of Moore's compilation (1908) he had found in the literature 60 cases of single kidney, which in addition to the cases previously collected by Billowitz and Moore made a total of 81. In the personal observation cited the left kidney, renal artery, vein, ureter and suprarenal body were absent. He suggests that unquestionably nephroblastoma is attended with peculiar danger to life in case of single kidney where the ureter is occluded by calculi. It is important to remember that the vesico-ureteral orifice is generally absent on the side of the missing kidney. Cystoscopy should be supplemented by ureteral catheterization where two ureteral orifices exist, since in a small percentage of cases of congenital kidney a rudimentary ureter is present. The importance of a single kidney from a surgical standpoint can scarcely be overemphasized. According to Anders advanced lesion of chronic nephritis were found in thirty-two of the total cases, or 27 per cent, undoubtedly either acute or chronic nephritis in cases of renal agenesis gives a less hopeful outlook than when developing under normal conditions. It is essentially.

Mayo states that single kidney occurs more frequently in males whereas the so-called horseshoe kidney is encountered often in females. Among thirty-six cases of gross renal and ureteral anomalies observed in the Mayo clinic during a period of five years, twelve were of the horseshoe variety and six of the single type.

Thomas reports a case of pelvic kidney in a married woman of 35 diagnosed prior to operation for pelvic disease. The vagina was about an inch in depth and no uterus was discoverable upon palpation. The patient had never menstruated but suffered ovarian pain every two months. A rounded tender mass the size of an orange was detected in the left iliac fossa. There had been frequent attacks of urinary frequency during the last



Fig. 3. Case 2. Well-developed feminine figure, absence of vagina, uterus, tubes, and ovaries; single kidney located in pelvis.

year. The patient complained of abdominal pain, especially on the left side. Cystoscopy showed the urethra and bladder normal. Left ureteral catheter arrested 2.25 inches from bladder; right side apparently normal; urine from both sides practically the same. Radiography after double injection of colloidal silver showed pelvis of hydronephrotic kidney low in left bony pelvis. The ureter was 3.5 to 4.5 inches in length.

Cullen mentions a girl of seventeen who had never menstruated. Inspection revealed absence of the vagina. Rectal examination disclosed a hard irregular mass filling right half of pelvis, thought to be uterus with retained menstrual fluid. Coeliotomy right pelvic kidney, uterus and left kidney absent; prolapse of tubes and ovaries in inguinal regions.

Blissell reports the successful reimplantation of a right pelvic kidney in a female of 41. When observed the patient was about eight months advanced in uterogestation; premature labor was induced, and after some delay an asphyxiated child delivered. One month later the pelvic kidney was reimplanted in its normal situation.

During routine examination of the body of a male of 30 who died of valvular cardiac disease Ward found no trace of the right kidney. The left kidney was twice the ordinary size with normal pelvis and ureter.

At autopsy upon the body of a female of



Fig. 4. P diagram. Kidney in front and to left of sacrum hilum looking internally; concave border external.

38 who died following a protracted debauch Glazebrook found a single right kidney. There were two pelves and a single bifurcated ureter. The left kidney and ureter were absent. The right ureter below the bifurcation was normal in size and communicated with the bladder in the proper situation.

Stengel observed at autopsy a single kidney with two ureters and suggested that the surgeon in such a case after using the catheter might be deceived in thinking there were two kidneys and undertake an operation thus the only kidney might be removed. In fact a case of this character was operated upon by Polk of New York (1882); the pelvic mass removed being the right kidney. The patient lived thirteen days with complete anuria, and at autopsy it was found that this was the only kidney.

Mayer and Nelkin cite a case in which there occurred suprapelvic traumatic rupture of a solitary right kidney. No evidence of the left kidney could be found although there were two ureters opening into the bladder in the normal situations. The patient died



Fig 5 Cystogram showing distention of kidney with normal rounded outline in distention



Fig 6 Sigmoid rectum transverse, right side of pelvis Case 1

thirty six hours after operation. Necropsy revealed congenital absence of left kidney, traumatic rupture of right kidney, retroperitoneal hematoma, acute nephritis, kidney infarcts.

Secher describes the necropsy findings in a child without left kidney or ureter, the suprarenal gland being unusually large, the genital organs were also asymmetrical. He states that while about three hundred cases of single kidney have been reported in the literature of the world, these figures are misleading since distinction between total aplasia and atrophy is not always clear. The kidney was single in 1 of 8150 cadavers examined, ie once in every 1104 cases. According to the records the anomaly occurs twice as frequently in males as in females, and the left kidney is usually missing. The abdominal vessels and genital organs ordinarily display more or less deformity in such cases.

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TERATOGENESIS OF A HUMAN ATHORACIC ACEPHALIC ACARDIAC TRIPLET WITH NUMEROUS AGENESES

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IT is with a sense of diffidence and more or less with a consciousness of temerity that I have consented to reopen a subject which has been illuminated by the contributions of the most distinguished members of scientific research. A review of the voluminous literature on this subject could not fail to impress one with the weight which is attached both here and abroad to the opinions of Ballantyne, Schwalbe, Hallfeld, Keith, Thiersch, von Winckel, Frankl, Stockard, and perhaps arouse the thought that the theme is well nigh exhausted. A further and more careful review of the literature on teratology almost convinces one of the futility to contribute with entire originality. In the hope however of eliciting a discussion which in some degree may help to enlighten our present knowledge this contribution is submitted.

To Dr. William F. Smith of Calexico, California, I am grateful for sending to the anatomical laboratory of the above mentioned institution a focus of considerable interest from a teratological standpoint and it, together with my previous investigations, constitutes a preliminary report upon which this communication is based.

The fetus is a female, one of triplets of 6½ months gestation with numerous ageneses, as is evidenced by the accompanying photograph and subsequent dissections. The other two fetuses were males and of normal

development. The monster is nine inches long and bears external evidence of the following aplasia: head, neck, thorax, upper extremities, and marked syndactylism of both lower extremities.

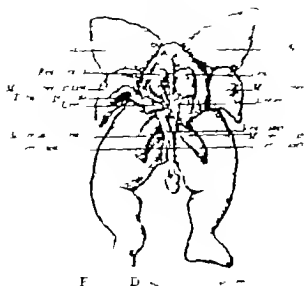
Careful dissection of the fetus disclosed complete acardia, asymmetry of the kidneys, the left almost twice as large as the right, absence of both adrenals, internal genitals, spleen, pancreas, and abdominal aorta. As to the alimentary canal, this was represented by a perpendicular tube in front of the vertebral column, terminating by the anal opening in the normal position.

It is agreed by all that in the human, only one embryo develops at a time, and it is equally agreed that twins are not infrequent. Indeed, even triplets and less frequently quadruplets are developed.

The most logical mode of twin production is due to a simultaneous fertilization of two ova, and also it may be brought about by the separation of a portion of a germ plasma of a fertilized ovum into two parts, development proceeding in each part independently to full maturity as is evidenced by experimentation on the lower animals. It is reasonable therefore, to assume that the latter mode of twin production must take place in the very early stages of development, i. e. before the formation of the blastodermic layers, since at that time the ovum is normally already attached to the uterine wall and enveloped by the decidua capsularis. To my knowledge the literature is silent on the possibility of development of triplets or quadruplets by the separation of a fertilized ovum into three or four parts, and although the result of my experimentation on the amphibian eggs does not yet warrant positive conclusions in this respect yet I entertain hopeful anticipation to be able to report the possibility of such mode of development in the near future.



Fig. Photograph of specimen.

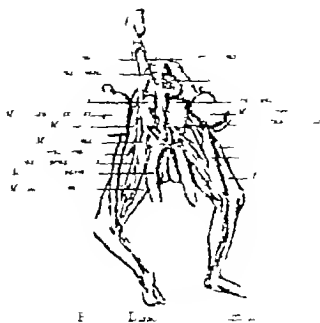


F. D. 1

It is an undoubted fact that the small number of embryos which are always found in the same sex are developed from a single ovum. This statement is also true in the case of triplets. In the manner undoubted that in however, none of the three embryos which had most probably developed from a separate fertilized ovum. Most of the usually from twin or triplet and most frequently a consequence of superovulation is the presence of two or more embryos at different ages in the uterus. In the case of two ova at the same period of ovulation. As a result we find almost always two or more fetuses in various stages of development. Since the mother in this case is except the malformation of the same stage of development I am rather of the opinion that its presence was due to superovulation.

It is difficult however to comprehend the stage at that much development of the monster without admitting that once decided direction proves it an ardia and microscopic section of the tumor discloses the presence of its normal structure. The monster had derived its nourishment through the attachment of its umbilical cord either to a placenta common to the two the fetuses or possibly to one of the placenta peculiar to each normal fetus.

It is agreed by all that abnormal conditions of the uterus are among the causes contributing to retarded development of malformations or even total destruction of the ovum.



F. D. 2

The following is a description of the monster. It is a small, white, fleshy mass, about the size of a walnut, with a head, torso, and limbs. The head is small and round, with a single eye and a small mouth. The torso is large and rounded, with a single arm and a single leg. The limbs are short and thick. The monster is shown in a standing position, with its arms and legs spread out. The drawing is labeled 'F. D. 2' at the bottom.

Again, in the case of I stated that monsters are produced at a very early stage of pregnancy, the possibility suggests itself that the very process of implantation of an ovum in a premenstrual membrane which has already

undergone histological changes may be entirely responsible or at least largely a contributory factor to the causation of arrested development.

That the defect may also be due to primary faulty maturation of the ovum is suggested from the report of Ballantyne quoted by Burnbaum that six deformed foetuses were born consecutively to one mother and all were of the same sex. And further that the malformation was not due to any abnormal conditions of the uterus, foetal membranes, or cord may be reasonably assumed from the state of preservation of the foetus in which, excepting the marked hypertrophy of the lower limbs, no evidences of intra uterine maceration or disintegration could be elicited.

That the enlargement of the lower limbs was due to hypertrophy and not to oedema I am convinced from external observation and macroscopic dissection of the foetus.

The amount of hypertrophy of the limbs since the monster died soon (ten minutes) after birth proves conclusively that it must have been present during intra uterine life.

As to the cause of this marked hypertrophy I venture to advance two main hypotheses first that it is due to a primary developmental hyperplasia, and second that it is a secondary hypertrophy resulting from overexertion. The first at once supposes that the structural precedes the functional abnormality due probably to a simple redundancy of growth. According to the second view the functional precedes and causes the structural anomaly.

It is a well-established fact that hypertrophy from repeated forcible contractions is a property of all muscle tissue voluntary or involuntary and further that tendency to normal hypertrophy is greater in the former than in the latter.

There is no proof to the contrary that hypertrophy may occur *in utero* under the same conditions as it does after birth, and owing to the extreme activity of the processes of nutrition and growth *in utero* it is quite possible that hypertrophy could probably take place more readily and to a greater degree *in utero*.

Again for the proper functioning of all organs perfect harmony of co-ordination is indispensable and a disturbance of co-

ordination of any magnitude is apt to exaggerate exertion. When, however I conjecture what the nature of such disturbance of co-ordination can possibly be, I fear that I am perhaps getting into a region of guessing. However I am tempted to advance the suggestion that it is possibly an intra uterine developmental neurosis. Assuming now as I do assume, that a functional cause is responsible for the hypertrophy of the lower limbs that cause I believe to be a disturbance of normal co-ordination and, although I do not wish to lay too much stress upon this functional cause yet no other adequate scientific suggestion has ever been advanced.

As to the causes of aplasia various scientific opinions are entertained.

Burnbaum is of the opinion that faulty and imperfect development of one-half of a twin blastoderm is the cause of malformations.

Schwalbe on the other hand reasons since it is accepted by all that malformations occur at a very early period of development, and since they may be caused by primary developmental defects as well as secondary degenerations hence special investigations must be undertaken separately for every malformation, and he adds that partial destruction of one germ may be considered as a cause, but he does not suggest how that partial destruction may possibly be brought about.

Von Winckel maintains error of development as a cause which must occur before the development of the circulatory system. Imperfect or arrested segmentation is also suggested as a cause.

F P Mall, quoted by E I Werber holds that faulty implantation of an ovum in the wall of a diseased uterus, together with the inadequate nutrition arising therefrom, is responsible for defective development.

O Hertwig, from his experiments with amphibian eggs, subjecting them to the action of a weak solution of sodium chloride, suggests that monsters in the human may possibly be due to the presence of certain poisons such as alcohol or toxins in the blood of the mother.

C R Stockard in a series of experiments with fish embryos, subjecting them to the

action of different chemical substances proved beyond the shadow of a doubt that not only in the very early stages of development but even in the late stages deformities may be artificially produced and although those deformities are evidently caused only by subjecting the eggs to various chemical substances yet he justly admits that this may not be the sole cause of such defects and that any factor capable of influencing the developmental energy could possibly induce similar results.

E. I. Werber from his very recent researches on the eggs of fish besides corroborating the findings of Stockard suggests the possibility of some products due to pathological conditions of metabolism as a teratogenic cause.

It will be noticed that all agree on malformations occurring during the very early stages of development. While I fully coincide with Schwalbe that for each malformation a special investigation should be undertaken yet I venture to maintain that for monsters like the one discussed in this communication one is forced to admit not only the possibility but a high probability of some factor at an early stage of development to be entirely responsible for the cutting off as it were of the anterior half of the embryonic rudiment.

That mechanical forces are capable of producing marked influences on early or even late developing ova or embryos is evident from the experiments of Lewis who produced typical monsters by mechanically injuring the anterior part of the embryonic shield in the developing egg. And also though not necessarily in every case mechanical influences applied to developing eggs during late stages were equally productive of the same results.

On the other hand, Spemann successfully produced monsters by constricting the segmenting eggs with delicate fibers.

May it not be reasonable to suggest, therefore that some such mechanical cause under favorable circumstances may produce an intra uterine constriction of the ovum in early or late stages of development in the lower mammals and also in the human.

The most frequent variety of human monsters is *holo-acardiac cephalus*.

Taruffi was able to collect 108 cases and Foerster states that *acardiaci* formed 18 per cent of his collected cases. In this class of monsters the entire anterior half of the body above the umbilicus is absent and only rarely are rudiments of the missing structures present.

The morphological appearance alone of such monsters suggests the possibility of an intra uterine factor in the nature of a constriction, to be a responsible cause. That constriction I believe to occur in the amnion at an early stage of development, when the separation of the embryo from the blastoderm takes place in the form of an hour glass contraction and as I have intimated above cutting off the anterior half of the embryo on its disk. I am advancing this as an hypothesis and am inclined to believe that in future I shall be able to substantiate this hypothesis experimentally.

If now we admit the possibility of such constriction the various aplasias in this or any such similar monster are quite apparent and do not require any further elaborations.

Careful dissection of this monster and its funus shows the circulation in no way to differ from the usual manner of distribution of the blood vessels in such monsters as first pointed out by Hempel and quoted by Schwalbe that the blood flows to the *acardiacus* through the umbilical arteries and returns through the umbilical veins. It must be remembered that this abnormal circulation is the product of imperfect development and not the cause.

As to the aplasia of the uterus tubes and ovaries it is well known that the genital glands become the ovaries the cephalic portions of Mueller's ducts become the fallopian tubes, and the caudal portions since they are situated close to one another become eventually confluent into a single tube from the proximal part of which the uterus develops and from the distal the vagina.

From their embryology aplasias or malformations of these organs are easily understood. Thus while malformations of the internal genitals may be the result of partial hindrance from growth of portions of Mueller's ducts symmetrically or asymmetrically aplasia must be due to complete hindrance

from growth of Mueller's ducts or may be entirely undeveloped.

In this monster however since the external genitalia are present, particularly the vagina, it is evident that only the caudal portions of Mueller's ducts participated in the process of development, the cephalic portions disappearing or failing to develop entirely.

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A CONTRIBUTION TO THE ETIOLOGY OF CANCER OF THE OESOPHAGUS AND STOMACH

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By the ancient Roman physicians the oesophagus was called *gula* or stomachus, by the Greek physicians *oesophagus*. Cancer of the oesophagus was probably first described by Galen in the second century under the name of *carcinosis stomachi*. The Arabian physician Avenzoar (1) 1070 to 1162 had good knowledge of cancer of the oesophagus. He originated the method of feeding through a tube patients suffering with this disease and he also introduced the method of rectal feeding in such cases.

ETIOLOGY

The discussion of the etiology in this paper is devoted particularly to the consideration

of a local predisposing cause, which the writer thinks important. Cancer of the oesophagus was formerly considered a rarity and in French statistics for the Seine Department between 1830 and 1840 only 13 cases were found in 9178 deaths from cancer. In the Wuerzburg statistics by Virchow (2) 1852 to 1855 the oesophagus was not counted among the organs frequently affected by cancer. In 1901 Fellchenfeld (3) on the other hand speaks about the remarkable frequency of cancer of the oesophagus.

HEREDITY

Bainbridge (5) sums up the question of heredity in cancer in general as follows: Heredity has been shown to play a rôle but

not one to cause anxiety. Kraus (4) in discussing cancer of the oesophagus says that heredity plays no important part.

GEOGRAPHICAL DISTRIBUTION

It has been stated that natives of the extremely cold regions and those of the tropics and subtropics are practically immune from cancer. Closer investigation however has shown that cancer is found among the Eskimos as well as in the natives of the tropics and von Hanseemann says that there is no kind of malignant growth among us that does not occur in the natives of the tropics and vice versa.

Trolard (6) during six years practice in the French hospital in Safi, Morocco where there came about 100 patients daily had only seen one case of cancer of the digestive tract (a case of cancer of the liver). He says that it is extremely rare among the Berbers. This has been the experience of others in Egypt and other parts of northern Africa.

In Sutherland's (7) report from Lahore, India, he states that among 43,412 patients admitted to the hospital between 1892 and 1903 there were 2 cases of cancer of the oesophagus and none of the stomach in 329 cases of carcinoma. Sutherland remarks that cancer of the stomach is rare.

Niblock (8) tabulating the records of malignant tumors in Madras General Hospital from 1892 to 1901 found 4,270 cases. Of these 976 were cases of carcinoma of which 21 were of the stomach and 3 of the oesophagus.

On investigation made in the Portuguese colonies (73) a total of 4 cases of cancer of the stomach and 3 cases of cancer of the oesophagus had been recorded in various hospitals some records extending back 13 years.

Cook (9) has seen cancer of the oesophagus among the natives of Uganda, Central Africa.

Maxwell (10) found that in 11,000 patients in Changpoo Hospital in South China there were 54 cases of cancer of which 8 were of the oesophagus (7 males, one female) and 2 of the pylorus.

At the hospital for Chinese in Tartar City, Peking, Foulkes (11) found a fair number of

cases of cancer. He mentions one case of cancer of the oesophagus.

Meldorf (11) has reported cases of cancer of the oesophagus and stomach in the natives of Greenland.

Renner (13) says that in the negroes in Sierra Leone who are aborigines are rather free from cancer there is increase in the cancer rate when they adopt the white man's diet and mode of living. In 453 cases admitted to the hospital from 1870 to 1900 there were 20 cases of malignant growth in 10,163 cases admitted from 1900 to 1909 there were 26 cases. One case out of the 40 was cancer of the oesophagus. No case of cancer of the stomach is mentioned in the report.

In the temperate climate which corresponds to the so-called civilized part of the world cancer is frequent but the statistics show that within this zone the death rate from cancer varies considerably in the various countries. Thus according to Williams (14) Switzerland has the highest cancer rate with 13 deaths per 100,000 living inhabitants and Hungary one of the lowest with 39 deaths per 100,000 living.

The relative frequency with which the various organs are affected by cancer varies in the different countries.

It is sometimes seen that cancer occurs more frequently in certain parts of a country, thus according to Haeblerlin (15) cancer of the stomach was the cause of death in

3 per cent of all deaths in northeast Switzerland, 1.5 to 2 per cent of all deaths in the western half of Switzerland.

1 per cent of all deaths in the southern part of Switzerland.

I have roughly figured out on the basis of

TABLE I.—CANCER OF THE OESOPHAGUS

	Males	Females	Ratio
Tatham (1)	58	83	77 to 100
Aschoff (2)	20	5	4 to 100
Frost (3)	207	2	104 to 100
Hansen (4)	255	7	36 to 100
Nisch (5)	205	7	29 to 100
Kraus (4)	584	85	6 to 100
Petri (6)	2	3	16 to 100
Voegt (7)	28	7	4 to 100
Gunn (8)	24	0	to 100
Leriche	416		

TABLE II.—SHOWING THE PERCENTAGE OF CANCER IN ALL DEATHS, AND THE PERCENTAGE OF CANCER OF THE OESOPHAGUS AND STOMACH IN MEN AND WOMEN IN THE POST MORTEM MATERIAL OF VARIOUS AUTHORS.

Authors	Number of Autopsies	Total Number of Carcinomata				Carcinoma of the Oesophagus				Carcinoma of the Stomach			
		Males	Females	Total	Per Cent	Males		Females		Males		Females	
						Cases	Per Cent	Cases	Per Cent	Cases	Per Cent	Cases	Per Cent
Reck	1103 above age of 5 years	55	1,315	117	4	11	6.5			130	39.5	36	3.65
Endlich	3,816 above age of 50 years	16	3	19	3	46	7	6	6	39		29.6	
Frischenfeld		113	274	387		14	61		6	21	39	44	5
Reichmann	7,379	362	340	702		30	5	14		69	46.6	19	24
Busley	4,020 above age of 50 years	177	179	356	42					69	34.66	5	16.25
Steinhilber	4,169 above age of 50 years	194	178	372	8.37		15		6	197	5	5	16.65
Musicki	7,186	252	34	286	6						6	6	16
Total	21,243	1,000	2,078	3,078	187	14	90	38		90		606	19.33

The cases of Frischenfeld are not included in the men total, as the number of autopsies is not stated. † Of all deaths.

TABLE III

	Ratio Males to Females
Fruchenfeld (1)	1 to 1
Fruchenfeld (2)	1 to 1
Endlich (13)	1 to 1
Reck (24)	1 to 1
Busley (15)	1 to 1
Steinhilber (16)	1 to 1
Musicki (17)	3 to 1
Harbau (18)	3 to 1
Average	1 to 1

the statistics of Nencki (16) that cancer of the oesophagus was the cause of death in

- o 7 per cent of all deaths in northeast Switzerland
- o 46 per cent of all deaths in the western part of Switzerland
- o 24 per cent of all deaths in the southern part of Switzerland.

Of all cancers in men, in the District of Wangen (Canton Bern, Switzerland) 36 per cent were of the oesophagus.

Kolb (17) found that in Bavaria cancer of the oesophagus was more frequent in the northern part than in the southern part.

In Normandy France, the rate of cancer of the stomach was very high in the south of France it was very low

SEX

Men are much more liable to cancer of the gullet than women. Table I shows the ratio

of male to female deaths from cancer of the gullet in various mortality statistics and in some collections of cases.

In Table II is shown the percentage of cancer in all deaths, and the percentage of cancer of the oesophagus and stomach in men and women in the post mortem material of various authors.

In Table III is seen the proportion of deaths from cancer of the oesophagus in men and women in the autopsy material of various authors.

In men carcinoma of the stomach is the first in order of frequency in most cancer statistics, and in some statistics cancer of the oesophagus comes second

AGE

Carcinoma of the oesophagus is a disease of middle and old age. It is comparatively rare under the age of forty.

According to Philipp (29) no case has been reported as occurring in childhood, and the youngest cases on record are probably—

Helman case, 9 years old Mampell case 30 years old Stewart case 3 years old Staryanis case, 24 years old.

Table IV shows the age and sex incidence of malignant tumors of the oesophagus and stomach based on the national mortality returns 1901 to 1903 for England and Wales.

TABLE IV

	Under 5 years	5 to 14	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	75 and up	Total
Males— Oesophagus		8	50	5	5	8	3	7	7	
Stomach	3	6	3	3	100	68	7	15	7	19
Females— Oesophagus		1	7	6	20	5	5	7	5	
Stomach	07		9		6	10	7	7	5	

TABLE V

Age	Males	Females
4 to 50	4	3
50 to 60	6	
60 to 70		
70 to 80		

Average age 53 years amongst males collected 76 years amongst females 33 years

TABLE VI — THE SITES OF CANCER IN THE OESOPHAGUS IN 30 CASES OF THE AUTHOR

Sites of Cancer	Centimeter from Incisor Teeth	Number of Cases
Lower third	39 14 27 5 34 3 5	3 1
Total		9
Middle third	10	
Total		
Upper third		
Cervical part		6
Total		

Table V shows the age incidence in 30 of the author's clinical cases of cancer of the oesophagus. In each case the diagnosis was made by microscopical examination of specimen removed through the oesophagoscope.

SITE OF CANCER IN THE OESOPHAGUS

Any part of the oesophagus may be the site of cancer as shown in Table VI. The question as to what parts of the organ are most frequently the sites of cancer is apparently as unsettled today as it was in the past century, some authors claiming the upper third, some the middle third and some the lower third. Only on the basis of large statistical material can this question be settled.

In Table VII I have brought together all

TABLE VII — CANCER OF THE OESOPHAGUS. TOTAL NUMBER OF CASES COLLECTED 4020. ARRANGED ACCORDING TO NATIONALITY.

	No. of Cases	Upper Third	Middle Third	Lower Third
England— Halsbrom Mactenna Vincent St. George Hospital London Newnham Ratting Turner Total	00 14 50 14 20 04	14 6 9 5 3	9 1 51 0	9 1 10 4
Germany— Peters Zank Celle Vogel Pugger Gottstein Sauerbruch Mampell Hofel Reichstein Redlich Ludwig Miesch Lewin Eck Eckhardt Total	6 6 7 7 56 7 7 5 42 37 5 45	1 1 20 30 6 3 0 3 5 5	9 1 9 1 3 3 3 3	4 1 1 1 1 1 1 1
France— Guzen Lamy Total	650 50 6	300 3 3	38 8	9 2
Russia— Kreskerson Morosov Voronov Johannsen Mampell Savvayev Total	7 80 9 15 7 3 6	5 9 0 6 20 3	9 1 1 6 3	9 1 1 1 1 1
Austria— Hacker Total	50 3 58	53 1	6 1	6 1
Netherlands— Pierikoff Loeber Stocker Total	3 23 31 58	1 0 0	9 1 1	30 6 1
Norway— Harbo Total	5 5	5	1	6
United States— Lerche, collected from literature and hospital reports Lerche, personal cases Total	80 3 9	9 1 9	6 1 6	6 1 6
Per cent Throat specialists	20 100	100 100	100 100	100 100

the groups of cases and scattered single cases that I have been able to find in the literature. It will be noted in this table which has

TABLE VIII.—GROUPS OF CASES FROM TABLE VII
PUBLISHED BY THROAT SPECIALISTS

	Total Cases	Upper Third	Middle Third	Lower Third
MacKenzie	200	44	18	138
Newman	443	117	98	228
Turner	42	24	—	18
Rawling	630	200	20	390
Total	1115	607	216	292
Per cent.		54	19	27

TABLE IX.—THE BALANCE OF CASES IN TABLE VII
AFTER THE CASES OF THROAT SPECIALISTS HAVE
BEEN SEGREGATED

	Total Cases	Upper Third	Middle Third	Lower Third
Per cent.	274	400	544	10
		3	37	4

been arranged according to nationality that in the English and French groups the upper end is the part of the oesophagus most frequently involved by cancer while in the other groups the lower part is affected in the majority of cases.

Koenig (54) in 1880 in discussing the question of the relative frequency of the seat of cancer in the upper middle and lower part of the oesophagus and referring to Mackenzie's (31) cases said: 'Can it really be that in England cancer of the oesophagus is so much more frequent in the upper third?'

It has been my experience in oesophageal work that patients who locate their trouble in the upper end of the oesophagus are apt to consult the throat specialist while those who locate their affliction in the lower part of the organ will consult the general practitioner the surgeon the internist, or the stomach specialist hence the latter cases become scattered among a larger number of consultants and are not reported because each one gets only a small number of cases. This observation seems to be borne out here, because if the cases published by the throat specialist are segregated the result is entirely different, as seen in Tables VIII and IX.

Note the striking difference between the groups of Newman, Turner and Rawling and the St. George Hospital, and likewise between Guémez and Lamy. Rawling says that he does not believe that cancer in the upper end of the gullet occurs in more than 10 per cent of cases. It seems reasonable to

assume that if a larger number of autopsy reports from large general hospitals in England and France come forth it is likely that they will show about the same results as those of the other European countries.

Although the number of cases here brought together may not be sufficiently large to settle definitely at what part of the oesophagus cancer most frequently occurs, it is highly probable that Table IX gives the correct answer representing as it does the clinical and post mortem records of large general hospitals and clinics in the various countries.

Assuming, therefore that Table IX gives the true expression the question immediately presents itself: Why does cancer occur more frequently in the lower part of the oesophagus than in the upper? For the sake of comparison I have analyzed 198 cases of cicatricial strictures of the oesophagus caused by swallowing corrosive fluids, and found that 18 per cent occurred in the upper part 29.8 per cent in the middle part and 52 per cent in the lower part of the organ. This corresponds exactly to the seats of predilection of cancer of the oesophagus. The question is whether this is a mere coincidence, or whether there is some definite physiological law that determines these so-called seats of predilection?

In a previous paper (55) I have shown that the relative frequency of the seats of cicatricial strictures of the oesophagus following the ingestion of corrosive fluids increase from above downward for the reason that the speed of the peristaltic wave which propels the oesophageal contents decreases from above downward, thus permitting the corrosive fluid to remain longer in contact with the oesophageal mucosa in the lower parts, with consequent deeper insult. In the lower thoracic part where the content comes to a momentary stop the destruction is usually the most extensive and this part is the most frequent seat of cicatricial strictures. The upper end which is the narrowest part of the oesophagus, and where the peristaltic movement is swiftest, often escapes entirely.

The narrowest part of the oesophagus is at the inlet, and from there to the cardia the lumen increases (with slight constrictions at certain parts) so that the statement found in

most textbooks—that cicatricial strictures as well as cancer of the oesophagus are found at the physiologic constrictions inferring that the latter are responsible for the pathologic conditions mentioned—does not seem to have sufficient foundation. Furthermore in animals we find physiological constrictions and yet in these cancer of that organ is extraordinarily rare.

If we now examine the stomach from a similar viewpoint we find that in regard to the parts of the organ most frequently affected by ingested corrosive fluids it has been observed that when a smaller quantity has been swallowed the effect is most frequently seen along the lesser curvature and in the pyloric region particularly in the latter.

Thus Hoffman (56) describes a specimen of a stomach in which continuous, 3 to 10 mm wide streaks caused by swallowed hydrochloric acid were found along the lesser curvature from the cardia to the pyloric region. In the latter region the area of destruction was most extensive while the rest of the stomach with the exception of a few insignificant scars in the fundus was normal. This corresponds to the findings of Ernest and others.

According to Aschoff (74) lesions from swallowed acids are especially found along the lesser curvature.

It seems apparent therefore that corrosive fluids like other fluids swallowed ordinarily pass from the oesophagus along the lesser curvature of the stomach to the pyloric region where the corrosive fluids remain for some time.

The reason why the fluids pass along the lesser curvature which I have called attention to in a previous paper (68) is that the inner oblique muscular layer of the stomach contracts in such a manner as to bring the cardia and the pyloric part closer together and to make the gastric mucosa form a trough or canal into which the fluids coming from the oesophagus are directed. This canal becomes so to speak a continuation of the oesophagus and although it has already been given various names it seems to me that the designation *gula gastrica* or the gastric gullet would be quite appropriate. The function of this canal has been demonstrated in the dog by Cohnheim and in the horse by Ellenberger.

In experiments on certain animals it has been observed that fluids are spurted into the stomach with considerable force which is likely due to the contraction of the epicardium. If this is also the case in human beings the speed with which the fluid travels would probably be greatest as it emanates from the cardia, and would decrease toward the pyloric region with the same consequences that we have seen in the oesophagus namely that the upper part may escape while in the lower part where the speed is slowest and especially in the pyloric region where the fluid comes to a stop the injury is most extensive when corrosive fluids are taken. The pyloric region is the part of the stomach most frequently and usually most severely affected by the corrosive fluid at times it is the only part affected the rest of the stomach as well as the oesophagus escaping entirely.

Thus in 59 post mortem cases collected by Quenu and Petit (57) in which the stomach was severely damaged from the ingested corrosive fluids causing death the oesophagus was simultaneously affected in 34 of the cases. In 20 cases or 33.89 per cent the oesophagus was not affected. In 34 less severe cases that had been collected by the same authors and that had survived the effect of the poison and had been operated upon for obstruction in the pyloric region caused by the corrosive fluid the oesophagus was simultaneously affected in only 6 of the cases while 28 cases or 82.3 per cent had escaped.

It is of interest to note that in the 59 post mortems in which the effect of the corrosive fluids caused death the duodenum was only affected in 23.8 per cent. In none of the 34 cases of the second group was the duodenum affected.

In cattle similar observations have been made. Lichtenstern (58) found this in the post mortem examination of 5 cows that had to be slaughtered on account of illness following the accidental feeding of hot fluid fodder. The autopsy appearances were the same in all namely changes confined to the omasum or third stomach, while in the rest of the stomach and oesophagus there were no changes except in Cases 1 and 2 where parts of the tongue pharynx and oesophagus were also

found affected. Cases 1 and 2 stood nearest to the end where the fodder was poured into the trough. The function of the oesomus is to dehydrate the food, and fluid foods pass directly into this part.

In regard to the most frequent sites of cancer in the stomach, it may be said to be a repetition of what is true of cancer and cicatricial strictures of the oesophagus, namely, there is an increase from above downward, following what has been referred to as the continuation of the oesophagus, "the gastric gullet." In other words the cardia, the lesser curvature, and the prepyloric part are the regions of the stomach most frequently affected by cancer and Table V shows that this region was affected in 79.5 per cent.

TABLE X.—SHOWING THE SITUATION OF THE TUMORS IN 1,300 CASES OF CANCER OF THE STOMACH COLLECTED BY WELCH (59)

Pyloric region	782	or 60	8 per cent
Lesser curvature	48	or 3	per cent
Cardia	64	or 5	per cent
Prepyloric wall	44	or 3	per cent
Whole or greater part of stomach	61	or 5	per cent
Multiple tumors	1	or 1	per cent
Greater curvature	14	or 1	per cent
Anterior wall	20	or 1	per cent
Posterior wall	9	or 1	per cent

In Table VI, I have collected some more recent groups of autopsy cases, which show the same, namely 78.88 per cent. It will be noticed that in the latter table the percentage of cancers of the pyloric region is somewhat lower and the percentage of cancer of the lesser curvature is somewhat higher than in Table V.

The exact starting point of the growth may be impossible to determine at autopsy, but von Mielecki (27) found in his material of 156 cases of cancer of the stomach that the center of the carcinomata occurring in the pyloric region was several finger breadths away from the pyloric sphincter the latter being usually free.

Clinically according to Mikulicz (62) the lesser curvature near the pylorus is the primary starting point in most cases of cancer ventriculi—probably in 40 per cent, which would correspond to the pyloric vestibule and the pyloric canal.

Von Hacker (50) in 100 cases of cancer of the oesophagus found that the lower part of the organ was affected in 49.62 per cent. Of

these cases 27.49 per cent were found above the hiatus, while only 22.13 per cent were at the cardia.

It would seem then that just above and in the epicardia, and just above and in the pyloric canal, which probably are the parts regulating the evacuation of the oesophagus and stomach respectively are the favorite seats of cicatrices from ingested corrosive fluids, because there the fluids remain the longest in contact with the mucosa. The same parts are also the favorite seats of cancer (Fig 1).

TABLE XI.—SHOWING THE MOST FREQUENT SITE OF THE TUMOR IN 1,735 CASES OF CANCER VENTRICULI EXAMINED AFTER DEATH

Authors	Cases	Pyloric Region		Lesser Curvature		Cardia	
		Cases	Per Cent	Cases	Per Cent	Cases	Per Cent
Besley (23)	100	41	41	26	26	8	8
Bransford (46)	58	1	1.7	26	44.8	7	12.1
Gruber (46)	11	20.9	20.9	26	23.6	37	33.5
Halsford (64)	100	58	58	26	26	6	6
Reddy (22)	76	20	26.3	26	34.2	37	48.6
Ruschmaki (1)	100	27	27	26	26	37	37
Total	607	27	4.4	26	4.3	37	6.1

SEX

Cancer of the stomach occurs somewhat more frequently in men than in women, but in large statistics the difference is small, thus, in the statistics of Martin (63) of 20,000 cases 58 per cent were men.

AGE

Cancer ventriculi is a disease found most frequently between the ages of 40 and 70. It is comparatively rare before forty and after seventy. A number of cases have been seen in children, and it has been observed in the newborn. (see Table VII)

CANCER OF THE OESOPHAGUS AND STOMACH IN ANIMALS

Investigation has shown that cancer is not a disease confined to man because it has been demonstrated in nearly all species of vertebrates including marine fish living in a state of nature. The Imperial Cancer Research Fund (64) of London, in its reports 1905 makes the statement that the probability is that when the full facts are known the recorded incidence of cancer at all ages will

approximate in cattle and in mice that at all ages in the human subject

The statement in regard to the cattle was apparently founded upon the reports of Veterinary Inspector Trotter who in 190 found 1 cases of malignant new growths in 62 035 cattle of all ages and in 1903 found 131 cases of malignant new growths in 47 362 cattle of all ages slaughtered in Glasgow. Nearly all of the cases were found in old cows imported from Ireland.

The Research Fund also reported 3 specimens of cancer of the stomach in cows examined by them in 1903. On the basis of these reports it has been stated in more recent literature that cancer of the stomach is common in cattle.

In the statistics of Stickers (65) based upon the reports from the Berlin Veterinary school and the Berlin and the Munich Statistic Pathologic Institutes for a period of 22 years together with extensive search of the literature there were

- 8 cases of cancer of the stomach in horses
- 1 case of cancer of the oesophagus in a horse
- 1 case of cancer of the stomach in cattle
- 1 case of cancer of the stomach in a dog

Schmev (66) has recently reported a case of cancer of the stomach in a monkey 8 to 10 years old which corresponds to the age of 40 years in man.

To the United States Bureau of Animal Industry during the months of November and December 1914 and January and February 1915 there had been reported 94 cases of carcinoma and sarcoma in a total of 350 000 cattle killed or 0.004 per cent. There was no information given about the site of the tumors. The number of canners or old cows from the age of 8 to 15 years or older killed amounts roughly estimated to about 25 per cent of the total in some slaughter establishments—probably in all of them.

Not infrequently and for various reasons the viscera are condemned as food products and are disposed of without complete inspection. As such viscera might harbor malignant growths nothing conclusive can be drawn from the above reports. According to the experience of meat inspectors however

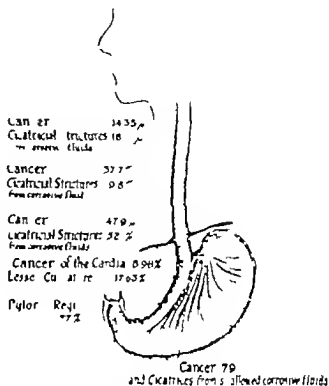


Fig. Schematic drawing of the human upper digestive tract showing the esophagus and the stomach and the gastric gullet also the relation frequently with the esophagus and carcinoma structure occur in the various parts of the upper digestive tract.

cancer of the stomach in cattle must be very rare.

In 1904, wild animals under observation in the New York Zoological Park (67) during five years but one case of true neoplasm occurred namely a sarcoma of the ovary in a raccoon dog. Seven hundred forty-four of these animals came to complete autopsy.

With the exception of the one case in a horse mentioned above I have found no report of cancer of the oesophagus in animals in the literature.

SUMMARY

A brief summary of what has been said so far in this paper shows that—

1. Cancer of the oesophagus is exceedingly rare in animal.

2. Cancer of the stomach is rare in animals.

3. Cancer of the oesophagus and stomach is comparatively rare in the natives of the tropical and subtropical countries.

4. Cancer of the oesophagus and stomach is common in certain countries in the temper

ate climate zone, inhabited by so-called civilized man

5 Cancer of the œsophagus is much more frequent in men than in women

6 Cancer of the stomach occurs with almost equal frequency in both sexes.

7 Cicatricial strictures of the œsophagus and the stomach, from swallowed corrosive fluids particularly form at certain parts of those organs and for definite physiological reasons

8 The favorite sites of cancer in the œsophagus and in the stomach correspond exactly to the favorite sites of the cicatricial strictures in those organs.

It seems, then that although any vertebrate organism may be the subject of cancer and that cancer of the œsophagus and stomach may occur in any race civilized man in particular is peculiarly liable to cancer of those organs. Why?

Naturally the food and drink passing into the œsophagus and stomach suggest themselves for investigation, and a great many articles of food and drink—particularly meat and alcohol—have been put down by various writers, as predisposing causes of cancer. The importance of some of these articles has possibly been overestimated on the other hand some authors are inclined to go to the other extreme and disregard food and drink as possible predisposing causes. Mackenzie (31) in 1880 said. Nearly a century and a half ago Van Swieten was disposed to attribute the origin of cancer of the gullet to swallowing very hot fluids, especially coffee which at that time was coming into general use. This view however was no doubt erroneous and was strongly opposed by Morgagni. Perhaps the view of Van Swieten was not erroneous after all.

It is said that the X rays have been responsible for the production of cancer of the skin in some cases and that in the wearers of Kangri baskets in the smokers of short clay pipes, the chronic irritation produced by those habits has been responsible for the growth of cancer

There is a reason why cancer of the œsophagus and the stomach is so common among the inhabitants of certain countries in the temperate climate zone.

There is a definite reason why 79 per cent of all cancers of the stomach occur in the small area comprising the cardia, the lesser curvature and the prepyloric region.

May not chronic irritation caused by the large quantities of hot fluids habitually consumed by civilized man, and the mechanism directing the fluids into the gastric gullet be responsible?

That cicatrices from swallowed corrosive fluids are especially found along the lesser curvature points to the possibility that fluids may have something to do with the fact that most of the tumors of the stomach are found in this very region—the high way of the fluids.

Habitual local application of undue heat, causing chronic irritation, appears to be inductive to malignant changes of the tissues in other parts of the body may not this also be the case in the stomach? If this view is correct it carries with it the conclusion that the hot fluids are also the main predisposing cause of cancer of the œsophagus

When I say hot fluids, I do not mean to the exclusion of hot solid or semi solid food but as these latter are more or less masticated and mixed with saliva, the temperature of such a bolus may be somewhat reduced by the time it reaches the œsophagus and stomach. Furthermore solid food is probably not directed along the lesser curvature to the pyloric part, the area in which the majority of gastric cancers are found

The hot fluid, on the other hand, is quickly swallowed and on entering the œsophagus passes swiftly along the upper part of the organ slower through the lower half and after coming to a momentary stop above the epicardium is propelled into the stomach, where it passes along the gastric gullet, as outlined and comes to a halt in the prepyloric part. As the fluid travels swiftly through the œsophagus its temperature has probably not become much reduced by the time it reaches the highly specialized epithelial lining of the stomach.

The probable relation of the function of the gastric gullet to the pathology of the lesser curvature I have alluded to in a previous paper (34).

Very hot or very cold drinks may be retarded in its passage through the œsophagus for the sphincter cardiacus is liable to be set up by extremes of temperature hence the mucous membrane may be exposed longer than usually.

Fluid like coffee, tea, soups etc. are habitually taken at a temperature that would be unbearable to the kind and the frequent travel of very hot fluids through the œsophagus and along the gastric gullet may have the same effect upon these parts as the heat from the Kangri basket has on the skin of the abdomen of the natives of Kashmir India (69). These people wear a basket containing a small vessel with burning charcoal next to the kind on the abdomen during the cold weather and the chronic irritation from this heat is considered the cause of the epitheliomata of the kind of the lower abdomen and thighs so frequently seen among them.

As mentioned before in this paper men are more liable to cancer of the œsophagus than women—probably about in the proportion of 1 to 1. On the other hand carcinoma of the stomach occurs with almost equal frequency in the sexes although somewhat more frequent in men.

How can this phenomenon be explained?

I think in the difference in the mode of drinking in men and women. While men commonly take large swallows and often drink hurriedly women almost invariably sip fluids and eat and drink more slowly. Consequently in women only a small quantity at the time passes swiftly through the œsophagus. When the hot fluid reaches the stomach however it strikes the highly specialized epithelium of less resistance than that of the œsophagus and coming to a stop in the prepyloric region the benefit of the milder swallow which saves the œsophagus is eliminated and both sexes are practically on the same footing. The epithelial lining of the œsophagus covered as it is with mucus may escape the effect of the heat in a small swiftly moving quantity of fluid while large swallows taken at short intervals do damage by longer exposure.

This is well illustrated by the effect of a small quantity of corrosive fluid swallowed as mentioned earlier in this paper which will often leave the entire œsophagus intact and only attack the lesser curvature and the prepyloric region or the prepyloric region only.

Thus it may be said that the pathology of the lesser curvature indicates that the physio-

logical function of the gastric gullet according to the theory of Retzius is correct. Nevertheless it may be said that the physiological function of the gastric gullet tends to support the hypothesis that fluid causing chronic irritation particularly hot fluid may be responsible for the lesion of this part of the stomach as well as that of the œsophagus.

Judging from the case of Petit and Ouenou the pylorus ordinarily does not permit the immediate passage of a corrosive fluid into the duodenum. In the 5 per cent of the 1st of the first group in which the duodenum was affected the corrosive fluid had probably overwhelmed the pyloric regulating apparatus and paralyzed it to such an extent as to interfere with its normal action.

According to Mueller (1) the temperature of fluids entering the stomach much above or much below the body temperature is quite rapidly modified and the fluids are not permitted to pass into the duodenum until they have attained a temperature approximately that of the body.

The pars pylorica therefore is apparently also an apparatus of protection for the delicate duodenum. The latter organ has the benefit of the protecting and modifying function of the stomach and it receives the contents of that organ in a condition for which it is physiologically adapted thus escaping the chronic irritation to which the œsophagus and stomach are exposed. That this has something to do with the relative freedom from cancer which the duodenum enjoys seems highly probable.

In light of what has just been said it is of interest to compare the cancer statistics of the north and south of Europe taking for examples those of Norway and Italy. The Norwegians are one of the healthiest races in the world according to the death rate during the last decade. The cancer rate however is comparatively high namely 9 per 100 000 population.

Recent statistics by Munch Soegaard (10) show that cancer of the stomach in the rural districts of Norway is 65.3 per cent of all cancers or 70 per 100 000 population.

Cautionately the death rate of cancer of the œsophagus is not mentioned here in the statistics but is not far off.

It is interesting to note that cancer of the female generative organs in the rural districts was only 5.5 per cent of all cancers which is unusually low (see Table VII). It is pointed out by Soegaard that cervical laceration must be frequent, as the peasants usually have large families. On the other hand gonorrheal infection is practically unknown among them.

The cancer rate in Italy is one of the lowest in Europe. It was 52 per 100,000 living inhabitants in 1899 (14). An analysis of the statistics (71) shows that cancer in general is less frequent in the south than in the north of Italy. This is particularly the case with cancer of the gastro-intestinal tract, and especially of the oesophagus and stomach. Cancer of the oesophagus and stomach combined, was 14.5 per 100,000 population. If the north and the south of Italy are considered separately however we find that the nine northern compartments show 19.8 per 100,000 living inhabitants, while the seven southern compartments including Sicily and Sardinia showed only 5.3 per 100,000 population of cancer ventriculi and oesophagi combined, or nearly four times as many in the north as in the south. The death rate from cancer of the female generative organs in Italy was 8 per 100,000 population but of this the north showed 9.8 per 100,000 inhabitants while the south had 5.8 (Table VIII). The difference between the death rate of the north and the south of Italy in cancer of the female generative organs is therefore not nearly so striking as the difference between the north and the south in regard to cancer of the oesophagus and stomach.

The death rate from cancer of the female generative organs in the rural districts of Norway was 6 per 100,000 living inhabitants, which is equal to the lowest in Italy. In other words, while cancer of the stomach in Norway according to the statistics, was several times as frequent as in Italy cancer of the other organs occurred with about equal frequency in both countries. In Norway (72) the consumption of meat and alcohol is low the consumption of coffee is excessively high (12.25 pounds of coffee and 0.12 pounds of tea per head per annum). In Italy (72) the

consumption of coffee and tea is very low (1.61 pounds of coffee and 0.005 pounds of tea per head per annum). The climate of southern Italy is nearly tropical.

In the Norwegian rural districts hot coffee in large quantities, is taken four to five times a day. The same is said to be the custom in the northeast part of Switzerland, and in certain parts of the latter country hot coffee with brandy is said to be a favorite drink.

TABLE XII.—RURAL DISTRICTS OF NORWAY

Cancer of the stomach per 100,000 population	70
Percentage	4
Cancer of the female generative organs	5
Percentage	1.5

TABLE XIII.—ITALY

Cancer of the oesophagus and stomach per 100,000 population—	
Italy	14.5
North Italy	19.8
South Italy	5.3
Cancer of the female generative organs per 100,000 population—	
Italy	8
North Italy	9.8
South Italy	5.8

In the first part of this paper we have shown the percentage of cancer of the stomach and cancer of the oesophagus in all deaths in various parts of Switzerland. In the south of Switzerland the population is almost entirely Italian in the western cantons the French predominate and in the northeast part the Germans. Again we see that the Italians are less prone to cancer of the oesophagus and stomach.

On the whole cancer of the oesophagus and stomach seems to be much less prevalent among the natives of the tropical and sub-tropical countries probably for the reason that a hot climate is inducive to frugality in diet in general and therefore the habit of taking large quantities of hot fluids is less likely to form.

CONCLUSIONS

1. Cancer of the oesophagus and stomach is peculiarly prevalent among the inhabitants of the temperate climate zone.

2. The relative frequency with which necrotic strictures from swallowed corrosive fluids occur in the various parts of the oesophagus increases from above downward in other words, the widest parts of the oesophagus are the most frequent sites of such strictures—and for physiological reasons.

3. The distribution of cancer in the oesoph-

agus corresponds to that of the cicatricial strictures from swallowed corrosive fluids and in all probability for the same physiological reasons

4 Any part of the oesophagus and stomach may be the starting point of cancer with the exception of the pyloric sphincter which rarely seems to be the primary focus. The organ immediately beyond namely the duodenum is practically immune from cancer. The reason for the two latter phenomena is probably that the ingesta do not reach the pyloric sphincter until they are properly modified

5 In view of the foregoing conclusions it seems logical to look to the ingesta of civilized man for the source of chronic irritation which lead to malignant changes of the oesophagus.

6 The supposition that swallowed fluid after emanating from the cardia are directed along the gastric gullet to the prepyloric region is strongly supported by the fact that the cicatrices from smaller quantities of swallowed corrosive fluid are usually found along this path

Seventy nine per cent of cancer of the stomach are also found along this path—the cardia the gastric gullet and the prepyloric region

8 As cancer of the stomach follows the highway of the fluid it seems logical to assume that ingested fluids in particular may be responsible

9 Alcohol and other irritating fluids probably play a part but in the opinion of the writer hot fluid so universally taken throughout the temperate climate zone in the form of coffee tea soups etc and giving rise to chronic irritation is the main predisposing cause of cancer of the oesophagus and stomach

10 Cancer of the oesophagus occurs less often in women than in men because women drink more slowly and take smaller swallows which pass quickly through thus saving the oesophagus while the less resistant mucosa of the stomach where the fluids come to a stop is more equally exposed in both sexes

11 The fact therefore that the ratio of cancer of the oesophagus in men and women is 3 to 1 while cancer of the stomach occurs

with almost equal frequency in both sexes points strongly to hot fluids as the important predisposing cause

12 This is further substantiated by the results of a comparison between the cancer statistics and the habit of the people in the north and south of Europe by the relative freedom from cancer of the oesophagus and stomach enjoyed by the aborigines of hot climates and the extremely rare occurrence of cancer of the oesophagus in infants

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RUPTURE OF BLADDER ASSOCIATED WITH FRACTURE OF PELVIS

WITH BIBLIOGRAPHY AND REPORT OF ONE CASE

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PROGNOSIS in intraperitoneal rupture of the bladder is as a rule either very good or very bad. The injury is either promptly diagnosed and successfully repaired or it is unrecognized or unsuccessfully treated and death from peritonitis follows in a few days.

In extraperitoneal rupture death does not usually come within the first three or four days even if the treatment has been inefficient or absent. The urine infiltrates through the soft parts in front below and behind the bladder and eventually comes to the surface through the inguinal canal through the femoral opening in the perineum or the prevesical space and is then often afforded an exit by incisions through the skin. All the urine may not extravasate into the tissues. The extravascular tension may become so great that a large amount of urine accumulates in the bladder and is thence evacuated normally or withdrawn by catheter. Prognosis so far as immediate mortality is concerned is not therefore as bad as in intraperitoneal rupture. In point of morbidity however the writer believes with Fuller¹ that most patients with extraperitoneal rupture of the bladder are left seriously invalidated for life.

The invalidism is due to several causes. The extravasation of urine is followed by infection suppuration and necrosis. The sloughing may become very extensive and in case of recovery lead to cicatrization contraction and loss of normal function of ureter bladder urethra or sexual mechanism. Another cause of more or less permanent disability is fracture of the pelvis which very often is associated with ruptured bladder. The bladder is perforated by a splinter of the fractured bone in most instances. But the two accidents fracture and bladder laceration may occur separately though from the same accident the overfilled bladder ruptur-

ing from a continuation of the force which caused pelvic fracture with wide separation of the fragment. This undoubtedly took place in my own case reported below. Even if the fracture is not in continuity with the bladder wound the extravasated urine is likely sooner or later to invade the site of fracture and to complicate it by adding infection.

Bladder laceration and pelvic fracture present for treatment two separate and very grave lesions. A study of the authorities shows a unanimity of opinion that the bladder should be drained promptly suprapubically by preference though a retention catheter in the urethra has served the same purpose in many cases. Suture of the tear is often unnecessary when the bladder is efficiently drained. On the other hand in the management of the bone fragments no such definite plan has been employed but most cases have been disposed of simply by applying a tight bandage about the hips. Direct treatment of the fragments by suture wiring etc. has been practiced on a few occasions but found unsatisfactory in the presence of urine and infection at the seat of fracture. Indirect fixation of the pelvic bone fragments by means of percutaneous screw and external clamps at points distant from the fracture and extravasated urine has not previously been described. The usefulness of this method is shown by the following report.

A boy 16 years old was brought to the hospital thirteen hours after the accident. While leading a colt with a long rope the colt broke away and ran dragging the boy about four hundred feet by the rope which had become entangled about the boy's right leg. The boy got up and stumbled along for several hundred feet before he fell unconscious. He had no recollection later of having walked or of anything that had happened after the horse made the first few jumps. It was noticed that urine and blood escaped profusely through a perineal wound. Since regaining consciousness some two or three hours later he had had a constant severe pain chiefly in the sacral region.

On examination he was found to suffer from shock and loss of blood seemed conscious, and complained of extreme pain in the pelvis. The left scapula was fractured transversely. There was wide separation of the symphysis pubis and the entire left os innominatum could be moved about freely upon the sacrum. A lacerated wound in the perineum two inches long and located to the left of raphe had torn through the anal mucous membrane, sphincter ani and muscle wall of rectum upward for an inch. This wound extended around the urethra to the left and opened into a large cavity bounded in front by the separated pubic bone fragments and the rectal muscles above and behind by peritoneum stripped loose from the abdominal wall and limited below by the collapsed bladder which was torn loose from its pubic attachment. A two and one-half inch curved laceration encircled two-thirds of the neck of the bladder on the left side. X-ray plates showed that outside of the separation of the symphysis and marked separation of the left sacro-iliac joint there was no further fracture of the pelvic bones.

A few hours later after recovery from shock, operation was performed. The bladder wound was sutured with one row of eight interrupted chromic catgut sutures. Three similar sutures closed the sphincter and rectal wall. The perineal wound was partly closed a rubber drain placed in front of the bladder and a permanent catheter through the urethra. The separation of the pubic bones was so marked and the fragments were so extremely movable that it was evident that some fixation of the bony pelvis was necessary. An attempt at tight strapping about the hips had been found inefficient to hold the symphysis together and to control the excruciating pain in the sacro-iliac region. The expedient of external fixation of the fragments by means of Freeman's screws and clamp was then adopted. A small incision was made on each side of the symphysis through healthy tissues, down to the bodies of the pubic bones, and the screws inserted. The bones were approximated and the external clamp applied.

The pain in the back subsided rapidly after the bone fixation. The perineal wound however was infected from the beginning, the bowels having moved involuntarily both before and after the operation. All urine came through the urethral catheter during the first week. It was bloody-purulent and filled with motile bacteria. The general condition improved steadily and the wound healed with surprising rapidity. Daily acetic acid irrigations of the bladder were employed to prevent incrustations. On the eighth day a urinary leakage through the perineum appeared. This increased in amount until the fifteenth day when the catheter was permanently withdrawn from the urethra. Natural urination began at once and increased in volume so that at the end of the first month there was but a slight perineal leakage. A small fistula through which a little urine discharged every five

or six days, persisted for several months, but finally healed entirely.

The Freeman screws in the pubic bones loosened and were removed on the twelfth day and a sacro-iliac belt applied. Bony union was not expected in the presence of infection but the bones were held in fair approximation while a firm and serviceable fibrous union was established.

The patient left the hospital after nine weeks treatment. His urine was still purulent and a slight perineal fistula was present but he was able to walk and had partial control which enabled him to hold his urine for an hour or two at a time.

A recent letter, two years after the accident states that he occasionally has partial urinary incontinence while in the erect position but he has perfect continence during the entire night, is free from pain has pulsance, and is in good general health. He belongs to the class which has recovered, although it is not fully cured. The tendency to incontinence is undoubtedly due to retraction in the cicatrix at the bladder neck which interferes with the sphincter function when he is standing.

The writer has conducted what is believed to be a fairly complete search of the literature and collected 126 cases of rupture of the bladder associated with fracture of the pelvis, a synopsis of which is submitted herewith. In the majority of these cases it was found that a spicule of bone had perforated the bladder. Most lacerations thus caused were extraperitoneal and several were multiple. With the exception of the instances where a foreign body had entered the pelvis from without (gunshot etc.) only four cases in which a lacerated bladder communicated with the outside have previously been described.

The treatment of the fracture itself is mentioned in only a few of the reported cases. With two or three exceptions it has evidently been limited to the application of a bandage around the pelvis after possibly some readjustment of the fragments. The treatment has often been seriously complicated by infection and necrosis of the bone.

Of the 127 cases now reported 34 recovered, making a total mortality of 74 per cent. But of these were 83 cases reported before 1890 with a mortality of 72 or 86.7 per cent. Of 44 cases since 1890 i.e. during the period of aseptic surgery 23 lived—a mortality of less than 48 per cent. As a further proof of the increasing efficiency of

OLIGURIC RUPTURE OF THE BLADDER

scientific surgical treatment in this class of injuries we may note that out of 1 cases reported since 190 only 8 died reducing the mortality to 38 per cent. No doubt this figure may be discounted to some extent by an increasing tendency to report only successful cases. The earlier reports were largely from autopsy protocol.

The total mortality in all varieties of bladder ruptures which have been treated surgically since 1900 is less than 5 per cent. This shows in figures the extreme gravity of the lesions under discussion and indicates that fracture of the pelvis is the most serious complication of a ruptured bladder.

There is no reliable method of learning the facts about postoperative invalidism in these cases, but it is to be hoped that with the general advance in surgical technique the ratio of improvement in result in the resected patient may become equal to the improvement in mortality.

SYNOPSIS OF CASES OF RUPTURE OF THE
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crushed under a heel and sustained a rupture in the anterior wall of the bladder separating the sacro-macrosymphysis and causing a fracture of the sacrum. Edema of the perineal skin and the labia minora were made this day. The patient was at home 10 months. Patient sent to the hospital 1 year later.

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The results of the analysis of variance are presented in Table 1. The analysis of variance for the first experiment revealed that the interaction between the treatment and the sex was not significant. The analysis of variance for the second experiment revealed that the interaction between the treatment and the sex was not significant. The analysis of variance for the third experiment revealed that the interaction between the treatment and the sex was not significant.

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Male, aged 32 was run over. Bloody urine by catheterization. He died the fourth day. Autopsy: rupture in right side leading into small cavity in cellular tissue infiltration laceration of symphysis pubis.

CASE 30. Hewett, Lancet, Lond. 850, 1, 573. Patient, man of 3 years, was crushed by falling timber. Upon catheterization no urine as obtained. Urination of abdomen etc. free urine escaped after incision of urethra and swollen parts. Patient died the fourth day. Autopsy: fracture of pelvis rupture of bladder behind symphysis communicating with cavity containing pus, etc.

CASE 31. Hewett, Lancet, Lond. 85 573. Patient, male aged 34 fell from a height and died in house. A tony rupture of bladder behind pubes separation of symphysis pubis and fracture of pelvis.

CASE 32. Warren, Am. J. M. Sc. 85, xiii. A man of 30 was crushed by fall of earth and died on the way to the hospital. Autopsy: peritoneal cavity filled with blood rupture of bladder posterior to symphysis fracture near symphysis through ilium etc.

CASE 33. Currie, Med. Press & Circ. 853 405. A male aged 35 was caught under a cart and sustained pelvic fracture. Operation after 24 hrs. Incision 1/2 inches between tuber ischi and anus, evacuation of peritoneal urine retention catheter. Patient recovered in 4 months.

CASE 34. Warren (854) in Lesur. Thiers de doct. Par. 1833. A man of 30 was crushed and died in an hour. Autopsy: rupture of bladder behind symphysis pubis separation of symphysis fracture of pelvis.

CASE 35. Stanley, Brit. M. J. 857. A boy of 8 was injured by gas falling on him and died on the sixth day. A tony fracture of right pubis, separation of sacro iliac synchondrosis four ruptures in bladder etc.

CASE 36. Dubreuilh, Bull. Soc. Anat. d. Par. V. p. 7. Patient, male sustained accident producing luxation of all pelvic articulations pelvic fracture and other extensive injuries including rupture of bladder. Treatment, etc. not mentioned. Patient died.

CASE 37. Croly, Dublin Med. Press & Circ. 850. A man of 66 was run over. He was catheterized (clear urine) but had no inclination to urinate. Patient died the second day. Autopsy: fracture of right pubis rupture of bladder anteriorly urinary infiltration.

CASE 38. I. Wre. Bull. Soc. Anat. d. Par. 863, xxxviii. Patient, male was injured in accident and died in 4 days. A tony: meniscus pelvis fractures transverse rupture of bladder posterior wall.

CASE 39. Shoemaker, Nederl. Tijdschr. Geneesk. 86. Male aged 35 as injured in fall. Retention of urine blood by catheterization. He died after 4 days. Autopsy: separation of symphysis and fracture of pubis.

CASE 40. Harrison, Dublin M. J. 860. A boy of 12 years six months, as run over. He had voluntary urination developed erysipelas the fourth day and died the tenth day. A tony: rupture of anterior wall of bladder separation of symphysis and fracture of pubis.

CASE 41. Truettford, Union Med. Par. 864 xiii. A man of 50 as crushed by fall of bricks he had tumor in the right thigh almost to knee, non-fluctuant. Catheter drew blood and urine, retention catheter. Tumor fluctuated the thirteenth day and incision was made over it. Evacuation of blood urine, pus, etc. Fracture very possible. Wound base of bladder and one on the right side healed in 30 days. Recovery.

CASE 42. Rose, Charité Ann. Berl. 865. A male, aged 55 fell from a tree. He died from the urethra and catheter proved useless, after 4 days urine and blood etc.

passed spontaneously and in 1/2 months a urinary fistula developed. Urethromy performed after 4 months. Patient died. A tony: united fracture of pubis catheter found in cavity between bladder and rectum.

CASE 43. Fleming, Dublin Q. J. M. Sc. 866, xiii. A man of 60 was injured by wall falling on him. Bleeding through urethra he died in 48 hours. A tony: rupture of bladder anteriorly separation of symphysis and fracture of sacrum.

CASE 44. S. Mes, Dublin Med. Press & Circ. 866 1, 574. A man, aged 45 was injured in a fall. When seen 8 days later he had retention of urine upon catheterization blood, urine and pus were obtained tumor over hypogastrium. He died the twelfth day. A tony: two ruptures in anterior wall of bladder separation of symphysis peritonitis.

CASE 45. Shaw, Lancet, Lond. 1867 1, 74. A man of 50 fell while drunk. Blood and urine by catheterization there was tumor in hypogastrium and iliac region later voluntary bloody urine. Patient died the fifth day. A tony: both pubic bones were fractured the left pubis perforated the bladder & perineal infiltration.

CASE 46. Williams, Am. J. M. Sc. 867, lili 446. A woman aged 51 was run over. Bloody urine obtained by catheterization. She died in 48 hours. Autopsy: rupture of bladder by piece of fractured ilium.

CASE 47. B. Simpson, Am. J. M. Sc. 1868, iv. Male aged 55 injured in fall. He could not urinate there was rent in the neck of bladder and compression of the ureters of the uterus urine escaping through wound. Abscess developed. He died in bed for more than 10 weeks suffering from extensive suppuration. Patient recovered two years voluntarily suffering.

CASE 48. Grant, Austral. M. J. 868, xlii. Male aged 51 fell from a horse. Catheterization also red blood in bladder. He died in 36 days. A tony: blood in peritoneal cavity separation of symphysis with rupture of bladder behind.

CASE 49. Seely, Am. J. M. Sc. 868 1, 4. A man aged 35 crushed by heavy man. Blood by catheterization. He died the fourth day. Autopsy: separation of symphysis rupture in anterior part of fundus infiltration.

CASE 50. Logan, New Orleans J. Med., 870, xlii. A male aged 43, jumped from second story. Blood obtained by catheterization. He died. A tony: fracture of sacrum separation of symphysis pubis rupture of bladder beneath perineum.

CASE 51. Clark (87), in Bartels, Arch. f. Klin. Chir., 1878, xxi. A man, aged 30 as crushed. Peritoneal section made the third day blood and urine coming from wound he died the twenty-fifth day. A tony: rupture of bladder fracture of pubis and ilium.

CASE 52. Gross, Systems of Surgery, Philadelphia. 87. Patient young man, as injured in fall. He was unable to urinate and there was infiltration of urine into perineum etc. He died from peritonitis and gangrene 10 weeks after the injury. A tony: rupture of bladder fracture of ilium and pubis.

CASE 53. Smith, Dublin J. 87, lili 51. A female, aged 60, as run over had retention blood obtained by catheter tumor in iliac region. She died the nineteenth day. Autopsy: laceration of neck of bladder fracture of ilium and both pubes.

CASE 54. Dorech, Bartels, Dublin J. 873, lili. A man of 40 was crushed between cars. Anus, peritonitis he died in 48 hours. A tony: rupture of bladder separation of symphysis, deep depression of left pubic bone.

CASE 55. Dickenson and Holmes, St. George Hosp. Reports, Lond. 874, viii. A man aged 4 was injured

in a fall he fractured the ilium ruptured the bladder anuria following. Perineal section made patient died in 43 days. Autopsy rupture of bladder with fracture.

CASE 46. Jenden Deutsche Zeitschr. f. Chir., 1884. A male aged 35 was injured in a fall after which there was extensive suppuration in the bladder region. He was operated on the twentieth day through the right inguinal canal through which blood and urine were evacuated. Patient died in 6 months. Autopsy fracture of pubis and perforation of bladder.

CASE 47. Rudell Austral. M. J. 84. A male aged 36 injured by falling a horse fall on him died after 3 days. Autopsy separation of symphysis transverse rent in anterior wall of bladder.

CASE 48. Teissler Lyon med. 85. A male, aged 25 was crushed under a heavy mass. Blood and urine by catheterization. He died the third day. Autopsy six fractures of pubis corresponding to 3 ruptures of bladder bones perforating.

CASE 49. Barth Bull. Soc. anat. de Par. 1866. A man of 55 was run over. Blood and urine by catheterization. Patient died the second day. Autopsy extravasation of blood and urine subperitoneally, separation of symphysis pubis fracture of sacrum and pubis perforation of bladder.

CASE 5. Fleming Clinical Record of the Injuries and Diseases of the Genito-Urinary Organs. Dublin 187. Patient a man of 43 injured in a fall. He was taken to hospital after one week anuria tumor in hypogastrium. He died in 5 days. Autopsy cavity behind abdominal muscles filled with blood urine contracted bladder behind this fracture of sacrum, separation of symphysis pubis.

CASE 51. Fleming Clinical Record of the Injuries and Diseases of the Genito-Urinary Organs. Dublin 8. A boy of 7 was run over shock and collapse retention catheter. He died after 8 days. Autopsy fracture of both pubes with penetration of bladder.

CASE 5. Heath, Lancet Lond. 877. A man of 4 was injured by an engine bed falling on him shock scrotal swelling etc. bloody urine by catheterization. He died after 16 hours. Autopsy subperitoneal infiltration tear in anterior wall of bladder separation of symphysis pubis and sacro-iliac synchondrosis.

CASE 53. McDougall Edinb. M. J. 1877 Jan. Patient a man, was run over while drunk. Blood by catheterization symptoms of peritonitis tumor over pubis, fracture of ilium demonstrated treated by retained catheter followed by recovery.

CASE 54. Augur in Chaboureaux's Thesis de doct. Par. 1878. A man was run over and died in a few hours. Autopsy multiple fractures extraperitoneal rupture of bladder.

CASE 55. Bartels Arch. f. klin. Chir. 89. A man of 50 was injured by a horse falling on him. Examination showed fracture of pubes, bloody urine by catheter anuria extravasation relieved on tenth day by incisions. Slow recovery began using crutches after 6 months able to walk after 3 months all 6 years later but suffering from fistula etc.

CASE 56. Chaboureaux, Thesis de doct. Pa. 1878. A man of 24 was run over and died after 4 days. Autopsy multiple fractures rupture in anterior wall of bladder.

CASE 57. Chaboureaux Thesis de doct. Par. 1878. A boy of 4 was run over. Perineal incisions made for infiltration. He died in 6 days. Autopsy fracture of pelvis with extra-peritoneal rupture of bladder.

CASE 58. Chaboureaux, Thesis de doct. Par. 1878. A man was run over and died in 4 hours. Autopsy separation of symphysis pubis rupture of bladder posteriorly.

CASE 59. Demme in Bartels Thesis de doct. Par. 1878. A man of 18 was injured by tree falling on him. He was unable to urinate each morning groin catheter drew a few drops of bloody urine only in 15 on third day he died the sixth day. Autopsy fracture of pubis with a fragment perforating the bladder.

CASE 60. Curitt Hosp. Gaz. N. Y. 878. A male aged 31 was struck by a Retention of urine bloody urine by catheterization perineal incision and evacuation after 4 hours. He died in 3 days. Autopsy fracture of both pubes rupture of internal wall of bladder.

CASE 6. Cuenzberg Hosp. Gaz. N. Y. 875. A man of 45 was struck by a beam. He was unable to urinate and died in 60 hours. Autopsy rupture of bladder near symphysis fracture of ilium and pubis.

CASE 62. Louis in Bartholem. Fran. med. Par. 89. A man of 51 was injured in an accident and died after 7 days. Autopsy rupture of anterior wall of bladder fracture of pubis bone fragment penetrating bladder.

CASE 63. Velstein in Chaboureaux Fran. med. 878. A woman was run over and sustained a fracture of the pubis with a piece penetrating bladder and vagina fragment removed through glans. She recovered.

CASE 64. Knauth in Bartholem. Fran. med. 1878. A man of 4 was injured in a fall and died in 4 days. Autopsy quadruple fracture with piece of pubis penetrating bladder.

CASE 65. Barth Bull. Soc. anat. de Par. 1866. A man of 36 was run over and died in 3 days. Autopsy double fracture in pelvis and double rupture of bladder.

CASE 66. About from Chaboureaux. Man aged 3 was injured in a fall and died in 4 days from separation of symphysis pubis and extraperitoneal rupture of bladder.

CASE 6. Vollemmer from Chaboureaux. A male, aged 4 injured in an accident weight falling on his abdomen. Ruptured bladder fracture of pubis with separation of sacro-iliac synchondrosis. He died in 5 days.

CASE 68. Morris Lancet Lond. 883. A boy of 15 was run over. Blood by catheterization iliac swelling median incision after 10 hours showed blood in peritoneum no rupture found. Patient died after 24 hours. Autopsy fracture of both pubic bones rupture in anterior wall of bladder.

CASE 69. Rivington Lancet, Lond. 1882. A man of 4 was injured in a fall. Blood and urine by catheterization scrotal swelling. He died in 4 days. Autopsy fracture of ischium and pubis neck of bladder ruptured.

CASE. Stone Med. News, Phila. 1883. A male aged 2 crushed between cars sustained a laceration into peritoneal cavity through which urine escaped no urine by catheterization retention catheter applied. He died on thirty-fifth day. Autopsy separation of symphysis rupture through base and neck of bladder.

CASE 7. Alexander Liverpool Med.-Chir. J. 1884. A man of 41 was run over. Bloody urine by catheterization abdominal section made in 16 hours revealed rent in bladder by spicule of bone. He died the second day. Autopsy fracture of pubis fracture of sacrum laceration of bladder.

CASE 7. Cohn Bull. Soc. anat. de Par. 1866. A man of 56 was run over. Anuria bloody urine by catheterization. He died in 65 hours. Autopsy no infiltration of urine double fracture of sacrum bladder perforated behind symphysis by rupture of ligament.

CASE 73. Harrison Liverpool Med.-Chir. J. 1884. A man of 20 fell with a big stone on top of him. Blood and urine by catheterization median perineal incision.

made in 24 hours drainage established after exploration of bladder. Patient died the seventh day. Autopsy pelvis fractured in 6 places laceration of bladder in anterior wall and trigone.

CASE 74. Willard Maryland M J, 55; xll. A male, aged 3, was crushed under an engine. Anuria blood and urine by catheterization. Patient died in 3 days. Autopsy separation of symphysis, left pubis penetrating bladder fracture of ischium, etc.

CASE 75. Schrady Med. Rec., N Y 836 xxx, 44. A man was caught between wheels. Extra sation of urine operation in 24 hours, suprapubic cystotomy drainage established. He died the fifth day. Autopsy rupture of bladder urethra torn across multiple fractures of pubes and ischium, etc.

CASE 76. Hofmoll, Wien. med. Presse 886 xxvii, 7. Male, aged 27 fell from height and sustained double rupture (intra and extraperitoneal) of the bladder with disjunction of symphysis pubis and open fracture of right pubis. Laparotomy was performed 4 hours later, blood and urine found in perivesical cavity. Intrapertoneal rupture of fundus of bladder sutured, extraperitoneal rupture of bladder left open and drained and retention catheter left. Patient recovered slowly.

CASE 77. Briddon, N Y M J 887, xl M le, aged 33 was injured by stone falling on him. Blood urine by catheterization. Laparotomy in four and one half hours, permanent catheter inserted and drainage established. There was double fracture of pubes, rupture of anterior wall of bladder catheter removed the seventh day. Patient recovered, female present 7 months later.

CASE 78. Briddon, N Y M J 887, xlv Male, aged 4 was struck by locomotive. Blood urine per catheter perineal incision 6 hours later tube left in bladder suprapubic incision and drainage. There was a fracture of pubis with rupture of anterior wall of bladder. Patient died the sixth day. No topos.

CASE 79. Mason, Lancet, Lond 557, i, 7. A man, aged 36 was crushed by wagon. Bloody urine by catheterization. Incision over pubes, retention catheter applied. Patient died the seventeenth day. Autopsy fracture of pubes, right pubis pushed into bladder.

CASE 80. Robson Brit M J L Male, aged 65 was operated on for ruptured bladder but died 16 hours later. Autopsy showed perforation of anterior wall of bladder by bone fragment from comminuted fracture of pubes.

CASE 81. De Arx in Cor BL f Schweiz. Aerzt 833. A male sustained a fracture of pubis in an accident. Laparotomy performed and bladder found ruptured and was drained by retention catheter. Patient died after 24 hours. Autopsy showed bladder to be torn by fractured pubes, extraperitoneal hemorrhage.

CASE 82. Bond Lancet, Lond 830, Aug 4. A man, aged 34, was crushed by heavy mass. Laparotomy and exploration of bladder the third day. Patient died. Autopsy bladder lacerated 1 inch, fracture of ischium.

CASE 83. Dehollere Lyon med 889 March. A man was injured in fall. Fracture of both pubes with fragment penetrating bladder near the base extravasation also into peritoneal cavity. Operation in 24 hours through perineum retention catheter. Recovery.

CASE 84. Rowe Deutsche Zeitschr f Chir 80 xxx, 347. A male, aged 3 injured in fall. Suprapubic operation after 48 hours, rupture in anterior wall of bladder fracture of sacrum and pubes. Suprapubic drainage no sutures, continuous bath. Recovery in 6 months.

CASE 85. Imbrico Gior med d r oeristo etc., Rome 803 xl, 44. A man accidentally injured suffered an extraperitoneal laceration of the bladder together with fracture of pubes, and died in 7 days.

CASE 86. Arnheim, Deutsche med Wchnsch 1893 xix, 48. Female aged 41 operated after a pelvic injury found to have double extraperitoneal rupture of the bladder caused by penetrating pelvic bone fragments. Suprapubic operation with suture of bladder wound. She died the twentieth day.

CASE 87. Arnheim Pest med chir Presse Budapest, 803 xvi, 267. A man hurt in fall had laceration of the bladder and separation of symphysis pubis. Operation in the eleventh day wiring of symphysis, permanent catheter. Result extrusion of sequestra but recovery in 4 months.

CASE 88. Parker Societ of Clinics of London, 803 Jan 7. A boy 9 years old struck by car sustained fracture of the femur separation of symphysis pubis and rupture of the bladder. Operation suprapubic incision and drainage. Recovery.

CASE 89. Beckman Thoms de doct, Halle, 806. A man of 4 after pelvic injury was found to have an extraperitoneal rupture of the bladder with fracture of pelvis. Operation section with suture of bladder wound, retention catheter. Recovery in 3 months.

CASE 90. Cushing in Mitchell Ann Surg Phila 806 viii, 5. A man of 31 was crushed by heavy weight. He was operated on after 30 hours. Suprapubic cystotomy retention catheter. He died the fourth day. Autopsy result pie fractures perforation in anterior wall of bladder.

CASE 91. Van Slooten, Nederl med geneesk Arch 806 v, 33. Case of man run over. Operation showed extraperitoneal rupture of bladder with separation of symphysis and fracture of pubes. Suprapubic incision, retention catheter. Patient died in 4 hours.

CASE 92. Wacziarg, Zeitschr Feler d 8 Jaehr f d Aerzte Vortr zu Hamburg 806. Patient, man of 30 injured by heavy mass falling on him and operated 4 hours later. He was again operated the 7th day. Fracture of pubes with extraperitoneal rupture of bladder. Patient discharged as cured in 3 months.

CASE 93. Sub user (Muenchen) Muenchen 804. A man of 50 was crushed by locomotive and sustained fracture of pubes blood obtained by catheterization hypogastric incision made and drainage established retention catheter. He died the second day. Autopsy fracture of both pubes, bone fragment penetrating bladder diaphragm of left sacro iliac, symphysis.

CASE 94. Masciarelli Bull Soc anat de Par 807 p 860. A man was crushed by heavy block of stone. Symptoms of peritonitis laparotomy perforation of bowel, rupture of anterior wall of bladder fracture of ilium and pubes. He died 4 hours after operation.

CASE 95. Mitchell Ann Surg Phila 808 xxvii, 5. A man aged 5 fell from wagon and was crushed under wheel. Operated on 7 hours later fracture of left pubis and extraperitoneal rupture of bladder bladder wound sutured, patient kept in continuous bath for 40 days. Fully recovered in 9 months.

CASE 96. McLaren (806 case), J Am M Ass 808, xxx, 308. A man crushed by fall of bricks sustained fracture of the left pubis, bloody urine by catheterization, tumefaction of scrotum, etc. Operation, inguinal and perineal incision. Later secondary lumbar abscess treated. Recovery.

CASE 97. Biss, Bull Soc anat de Par 800 p 950. A man fell from height on the right side against heavy object, sustained multiple fractures of the pelvis, and died after 8 hours. Autopsy rupture of anterosuperior wall of bladder caused by bone fragment, fracture of pubis, sacrum, etc.

CASE 98. Lohrer, Bull Soc anat-clin de Lille, 800 p 733 cited by Jnoon. Male aged 43, was injured in

a fall Operation suprapubic cystotomy no bladder rupture was found. He died in 4 days. Autopsy three ruptures in bladder fracture of the two pubic bones etc.

CASE 90. Roedmann Thes de doct Leipzig 1800
A boy of 15 was injured by being hit falling on his abdomen abdominal tumour in 4 hours fracture of right pubis at the junction of blood urine. Operation bladder ruptured near neck sutured retained catheter. Rapid recovery.

CASE 100. Roedmann Thes de doct Leipzig 1800
A boy of 15 fell from a height on to a hard substance and sustained multiple fracture including fracture of the pelvis. He died 48 hours after the accident. Autopsy extensive renal rupture. Anterior wall of bladder.

CASE 0. Koedmann Thes de doct Leipzig 1800
Male aged 40 while drunk rubbed betwixt all and a dog. A fracture of the pelvis was found and no urine was obtained per catheter. He died the same evening. Autopsy separation of the pubic bones. Blood in peritoneal cavity rupture of anterior wall of bladder.

CASE 0. Mailland L. med 1801
Male aged 68 injured in a fall perineal extent but died on the 11th day. Autopsy showed a rupture of the bladder perineal at base of prostate.

CASE 0. Johnson Ann d. mal d. genit urin 1800
A man aged 40 was rubbed by a woman and sustained a pelvic fracture. Blood and urine in catheter. No extent in the rectum. He died the same operation. Rupture of bladder found at perineal extent all which was due to bone fragments. He died 5 days after the accident. Autopsy fracture of both pubes in addition to bladder perineal.

CASE 0. Baz Bull N. d. hi Par 1800 Mar
A man was injured in a fall from a horse and sustained a double fracture of the pelvis and rupture of the bladder. Hæmaturia and perineal incision made. Patient died.

CASE 05. Astuc Thes de doct Montpellier 1801
Male aged 40 sustained a fracture of the pubis and extensive renal rupture. Bladder found in gunshot wound. No urine obtained. Catheterization suprapubic. Incision made next day and three parts of the bone removed from the bladder. No urine drainage and retention with fever. In 4 months patient recovered without fistula.

CASE 100. Eastman N. M. J. 1803 LXVII 05
A man of 30 years was injured by a weight falling upon him. Pubic arch was driven in. No right and blood and urine per catheter. Suprapubic incision made. Spicule of bone of ramus of pubis penetrating anterior wall of bladder. Fracture of distal bladder drained and tamponed. Recovery.

CASE 0. Eastman N. M. J. 1803 LXVII 05
Male injured in a railroad wreck. Bladder and rectum impaled by sharp instrument. Fracture of ilium fracture of femur rectal and bladder wounds sutured. Retention catheter. Natural urination after 3 days. Recovery.

CASE 100. Eastman N. M. J. 1803 LXVII 05
A man crushed under a heavy mass sustained a fracture of the pelvis with rupture of bladder. Pubic arch driven in, anterior wall of bladder and roof of prostatic urethra torn. Bladder not sutured but urethral and suprapubic drainage bone reduced. Recovery.

CASE 100. Morel Ann d. mal d. org. genit-urin 1806 XL
Male aged 40 received a crushing injury. Blood per catheter. Operation next day. Anterior wall of bladder ruptured by bone fragment from iliopectic fracture suprapubic drainage. Patient died after operation.

CASE 110. Marnoch Ann Surg Phila 1806 XLIII
A woman of 40 fell 10 feet striking side of pelvis.

Fracture of pelvis demonstrated by palpation. Operation after 4 hours. Extraperitoneal rupture of bladder. Much was uterine and retained in the uterus. It was discovered at the hospital in 4 months.

CASE 1. Lepe C. M. J. 1800 100 Male
A man was injured by a fall on his back. No fracture demonstrated. No urine in bladder. Urine in the urethra. Perineal incision made. No urine. Bladder fractured in the pubic bone. Perineal incision made. Bladder fractured in the anterior wall.

CASE 1. Bell C. M. J. 1800 100 Male
A man was injured by a fall on his back. No fracture demonstrated. No urine in bladder. Urine in the urethra. Perineal incision made. No urine. Bladder fractured in the pubic bone. Perineal incision made. Bladder fractured in the anterior wall.

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A man was injured by a fall on his back. No fracture demonstrated. No urine in bladder. Urine in the urethra. Perineal incision made. No urine. Bladder fractured in the pubic bone. Perineal incision made. Bladder fractured in the anterior wall.

CASE 3. Stocker Riv de med. chir. Prat., 9
XIV 249. Man operated on for gunshot wound of
pubis, fragment of bone found to have been detached and
penetrated bladder laterally; bladder wound not sutured
but drained. Patient died.

CASE 24. Naumann Nord. med. Ark., Stockholm
9 21 No. Boy of 7 crushed by railway car
operation showed fracture of pelvis and tear in bladder
drainage of bladder and peritoneal cavity. Patient
recovered, fistula healed after 3½ months.

CASE 5. Fuller J Am. M Ass 9 4 1211 14

Male aged 3 pelvis crushed between cars. Perineal
infiltration and incision. After months X-ray showed
pelvic fracture. Operation demonstrated bladder rupture
extraperitoneal. Patient recovered slowly.

CASE 26 Blackburn and Cook Lancet, Lond. 9 5
11, 3. Man of 45 years on suddenly jumping on
horse felt severe pain and fell to the ground, bloody urine
per catheter; operated 6 hours later ramus of left pubic
bone fractured bladder torn in prostatic region, bladder
packed and drained. Recovery fistula healed in 3
months.

PELVIC VARICOCELE

B. J. ALVARADO WALL, M.D. S. TIAGO, CHILE

Late Assistant Surgeon, Women's Hospital

AS the Chilean literature on the subject
of pelvic varicocele is scarce I thought
it might be of some interest to report,
with a few comments the clinical his-
tories of the cases I have observed.

There are two varieties of ovarian var-
icocele primary and secondary. The former
is not associated with other genital diseases
while the latter is the result of a growth or of
a pathological process in the pelvic organs
the ovary, uterus, or broad ligament.

A condition of paramount importance in
all varicose diseases, such as hemorrhoids,
varices, etc. is chronic inflammation of the
vein-wall the starting point of stasis there-
fore a microscopic examination is necessary
before varicocele can be definitely diagnosed
as it sometimes happens that instead of var-
icocele we have simply a venous dilatation.
It is well known that during pregnancy the
tubo-ovarian veins reach an enormous size
a fact which I had the opportunity of pro-
ving to my satisfaction in a patient upon whom
I operated in September 1914 for a carcinoma
of the uterus. The operation was performed
during puerperal involution and we were
considerably handicapped in the Wertheim
panhysterectomy because of the enormous
size of the vessels of the uterus and broad
ligament.

The same anatomical grounds in the male
explain the greater frequency of varicocele
on the left side the position of the spermatic
vessels behind the ilio-pelvic colon and the

anastomosis to the renal vein should be con-
sidered especially the first factor when aggra-
vated by chronic intestinal stasis so common
among such patients. These mechanical
elements are not however pathogenic we
have to take into consideration the condition
of chronic inflammation of the fibrous tissue
which English authors call fibrosis or fibrositis
and which is usually produced by a slight in-
fection (Adami).

It is not unusual for these women to pre-
sent a persistent edema of the ovary and
sometimes of the uterus such as the elephan-
tiasis of a varicose leg or the enlargement of
a testicle below a varicocele. After a variable
length of time this engorgement may end in
sclerosis and finally in atrophy.

A number of gynecologists call attention
to the relation between varicocele and fibro-
cystic ovaritis. It is interesting to note the
peculiar softness of the ovary and uterus
when we are fortunate enough to treat the
disease in a very early state before the fibrot-
ic processes have taken place and gained some
ground. The uterus is very soft, like an old
cloth, and its walls are compressible. Such
characteristics are not found in other con-
ditions which are accompanied by uterine
swelling with perhaps the single exception of
a uterus shortly after a miscarriage.

The symptoms are very unusual. The
patients, often multipara complain of pain
in the lumbar region and in the lowest parts
of the abdomen. The pains are aggravated

when the patient stands and during or near the menstrual period and they subside when the patient lies down or when the flow has started. As the physical signs are very poor and often quite negative these poor patients are relegated to the large group of so-called neurotic. The menses are abundant and irregular as to duration and date of beginning. Another symptom often mentioned in the clinical histories is pelvic varicocele and the watery leucorrhœa which is very difficult and tedious to treat and like the other symptoms is greatly aggravated during menstrual periods.

The physical examination is very often negative but in favorable cases we feel a hard lump situated below the ovary which is almost always swollen and flaccid at the bottom of the pouch of Douglas. When standing, the palpation will be more positive and when suspected we must have recourse to examination in this position.

The co-existence of varicose veins in the lower leg and labia will be of assistance in the differential diagnosis.

The diagnosis after all we have said may be considered difficult and usually made by exclusion as is the case in all diseases which are accompanied by a few physical signs.

If a patient complains of pains which are made more severe by standing or walking and which are ameliorated when lying down if these pains increase when the menstrual flow approaches and when the menses are very profuse then we have sufficient reason to suspect a varicocele more especially when palpation reveals a soft mass quite independent of the ovary and tube. If the perineum is flail not resistant and at the same time varices and a bluish color are to be seen on the collum uteri and vagina the diagnosis is fairly safe.

Chronic appendicitis is the commonest error made in diagnosing these cases. Some of these patients are subjected to appendectomy with of course negative results. Chronic metritis is the next most common error. This is very easy to explain if we remember that leucorrhœa and an increase in the size of the uterus are two of the most frequent symptoms of chronic metritis. Edema due

to venous stasis and the transudation of lymph is the cause of these conditions. The leucorrhœa is very peculiar in these cases and it was asked the patient more closely regarding it they always state that the fluid is watery like urine quite different from the yellow discharge in cases of metritis.

Some surgeons are of the opinion that fibrocystic ovaritis is often the result of pelvic varicocele. Other deny any relationship between these two diseases. Without entering into a discussion on this point I think the practical conclusion to be drawn therefrom is that now we have made the first diagnosis we are in a way authorized to deny the existence of the latter but on the contrary our duty in such a case is to investigate it.

With these incomplete comments and before going into particular as to treatment let us briefly summarize the complication or an unusual symptom.

There are in the medical literature some cases of retro uterine hæmatocèle and ovarian hæmorrhage which possibly may be attributed to rupture of a varicose vein. The bursting and bleeding may take place between the layer of the broad ligament thus giving rise to a hæmatoma the result of which is ultimately and usually a fibrous new growth a kind of fibroma.

In October 1914 I operated on a woman suffering from a uterine cancer and as I found in the vicinity of the uterus a lump the size of a hazelnut I feared it might be of the same nature and the operation useless. The tumor was situated below the right ovary and its surface gave the appearance of worm. The pathologist's report as fibroma. Unfortunately there were no further details.

As during pregnancy the varicose veins undergo a greater development it is not unlikely that profuse hæmorrhages may supervene and the treatment of this condition is sometimes very difficult. At the annual meeting of the American Medical Association held at Atlantic City in 1914 Zinke of Cincinnati gave the history of a woman 35 years old 18 weeks pregnant, who consulted him because of profuse hæmorrhage. He curetted her. The bleeding however continued during five

months, at the end of which time and knowing that she was again pregnant, he resorted to laparotomy. He found a soft mass which he believed to be para ovarian and which he removed. The patient recovered her pregnancy following uninterrupted its normal course.

The treatment should only be surgical if we aim to obtain a permanent cure. Medical ly we can relieve the condition of such patients if we advise the recumbent position and the correction of pelvic organs by means of a vaginal plug or a reconstructive perineal operation.

CASE R. G. age 38 III para two miscarriages, the last one a year before. Since then m. menstruations were very profuse and painful. She complains of pains in both loins and deeply in the hypogastrium. She feels tiresome sensation. At the beginning of June the pains became more marked and she vomited several times. She had an abundant serous leucorrhoea which she could differentiate from that of some of her relatives who suffered from chronic metritis. The portio vaginalis was enlarged, the corpus voluminous and soft. Behind and to the left in the deepest part of Douglas pouch, a round, even and soft mass is easily palpable and tender to pressure. It was believed by myself and other examining physicians to be sclerocystic ovary.

Median laparotomy June 26 1906. The left ovary was soft, enormous, and easily movable. The utero ovarian vessels were greatly distended. The left ovary and accompanying tube were removed and great portion of tubo-ovarian veins by means of an incision of broad ligament parallel to the round ligament were resected.

Once the varicocele was recognized we immediately inspected the opposite side and as we found it the seat of a beginning stasis we decided to pass two or three ligatures through its most conspicuous veins.

The uterus was enlarged, reddish blue in color and so soft that it could be molded between the fingers, condition not previously observed by us.

The removed ovary was cut along its median line, giving a splendid view of the engorged veins. Microscopical examination showed a varicocele and oedema of the ovary. The removal of this organ was, as is demonstrated, not justified.

CASE E. D., age 34 multipara. As a result of violent train five years ago she felt an intense pain on both sides of the lumbar region. The pain, though less severe has persisted since that time. The periods are irregular and painful. She complains of pain on the left side of the hypogastrium. The pain is more marked when menstrual flow approaches.

The right kidney is slightly mobile the uterus is small, a little retroverted and movable the left appendage is enlarged and tender to pressure. A diagnosis of retroversion of the uterus and left adhesion was made. Operation August 26. The left ovary and tube were absolutely normal. The tubo-ovarian venous vessels on the left side were more dilated than usual. The right ovary was microscytic. The veins were very large giving to the broad ligament rather striking bluish color. The most prominent vessels were ligated the appendix removed, and both round ligaments were shortened (Doléris Richelot).

It is interesting to note the co existence of sclerocystic ovaritis and varicocele. I think it is very likely that the former is the end result of a prolonged stasis. I do not claim to prove that such is the only cause of this enigmatic ovarian disease my object is to explain the relationship if any between the diseases.

The surgeon may find upon opening the abdomen that no veins appear and he may thus fear a mistake in diagnosis has been made but the explanation is very easy as the Trendelenburg position favors venous circulation the pelvic veins, following the general rule empty with incredible rapidity and everything appears normal. In the patient whose history I have just given and in the next one I could conclusively demonstrate this phenomenon. This is, I think the cause of mistake in a patient where the palpating hand very distinctly discovered besides the ovary and tube many soft and elongated masses which disappeared after prolonged pressure. I was justified in making a tentative diagnosis of pelvic varicocele and fibrocystic ovary. The operation did not confirm the pre-operative diagnosis.

CASE J. M. A. C. age 38 V para menses of four days duration until that time since then they are regular and last week. The portio vaginalis is large and hard the corpus is enlarged. The uterine probe induces bleeding. The right ovary is easily palpated, is the size of a peanut, and is soft, fluctuating and not tender to pressure.

Diagnosis cyst of right ovary chronic metritis. The laparotomy was performed under spinal analgesia (Jonesco) and the diagnosis verified. A varicocele of the same side was also discovered. The veins were enormously dilated and they completely collapsed as soon as the supine position was assumed.

We opened the layers of the broad ligament and

resected a few centimeters of the most prominent veins. The ovary was the seat of a serous cyst and covering the surface of the tube. There were numerous small cysts both ovary and tube were removed. The appendix was removed. The left broad ligament and appendage were normal.

From all we have said the conclusion to be drawn is that this disease is not so rare as is usually thought and as would be indicated in the papers written on the subject. It has

been regarded as an exceptional condition because we do not expect to find it and because even when diagnosed we sometimes fail to recognize it as happened to me.

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PURPURA HÆMORRHAGICA FOLLOWING MENORRHŒA

B. FRANCIS ROE BENHAM M.D. S. R. C. L.

IN presenting a paper on the subject of purpura hæmorrhagica following menorrhœa it is not the purpose of the writer to discuss or percolate on the etiology of this condition. However the cause of the condition is and has been a matter of a great deal of theorizing and experimentation and I will therefore give a few of the theories advanced.

Briefly purpura hæmorrhagica may be defined as an abnormal condition of the blood or blood vessel and possibly both characterized by the appearance of hæmorrhages in different parts of the body. These hæmorrhages may be subcuticular submucous or subserous in fact they may appear in any part of the body. The subcuticular varieties appear under the skin and vary in size from a small pin point (petechiæ) to the large ecchymotic patch. The submucous is found as the name implies under the mucous membranes. Its size and appearance is not unlike the subcuticular. The subserous are found under the serous membranes.

The case which I shall report had all these different varieties of purpuric hæmorrhages.

There are many theories and opinions expressed as to the causation of this malady. Certain infectious diseases such as typhoid and malaria seem to produce a condition of the blood that not infrequently leads to attacks of purpura hæmorrhagica.

Letzenick believes purpura hæmorrhagica to be of infectious origin and has isolated a

bacillus not unlike the bacillus of anthrax. Auto-intoxication is said by others to be a causative factor in the production of this disease. It is thought that certain toxins absorbed from the intestinal tract so act upon the blood or blood vessel or both that coagulation is interfered with and as a result we have the hæmorrhagic diathesis with production of purpura.

Silbermann believes that in these cases blood pressure in the capillaries is greatly increased and as a result some of the small capillaries may rupture and thus throw blood into tissues. Again it is said to be produced by a process of diapedesis.

Kogerer and Silbermann who have spent much time in the study and experimentation of this condition summarize their work as follows. First the condition is the result of vascular disease. Second as a result of the vascular disease there is thrombosis formation. Third following the thrombosis there is extravasation of blood. Fourth following extravasation there is a discoloration of tissues and pigmentation.

The many and varied opinions expressed show that the etiology is unknown. I have very briefly gone over some of the literature on this subject to show the wide variance of opinion concerning the cause.

Inasmuch as we do not know the cause of this disease we are compelled to treat the condition. I believe the blood-count to be the first and most important initial step to be

undertaken in the treatment because if this condition is produced by a lack of certain elements of the blood these may be artificially supplied. This technique proved to be of great benefit to me in the particular case which I report.

I wish here to endorse the blood transfusion method as given by Richard Lewisohn in the *American Journal of Surgery* under date of October 1915. By this method the entire blood is injected direct from donor to recipient. A cannula is inserted into the vein and a 20 ccm. syringe filled direct from donor and injected direct into recipient. As large a quantity as is desired may be injected. The technique is the simplest of any blood transfusion operation I know of. It is not however without danger to the recipient. If too much blood is injected or it is injected too rapidly acute dilatation of the right heart may result. There is also danger of injecting too much air. A small quantity of air can be taken care of but a large quantity is extremely dangerous.

Purpura hemorrhagica is found most frequently in women.

In reporting my case I wish to emphasize the importance of family history as not infrequently we discover other members of the family to have been likewise afflicted.

A woman, age 34, father 65 and in good health, mother died at the age of 54 of cerebral hemorrhage, two brothers and three sisters are living and in good health.

As far as I am able to learn none of the ancestors was ever affected with this disease. When the patient was 3 she noticed a few spots on her limbs. These were at that time diagnosed as ring worms, *trichinella*. She has two children six and nine years of age. Both confinements, hard forceps deliveries. Was lacerated both times but repaired. Never has had any miscarriages. She began to menstruate at thirteen and has always been regular. Menstruation seemed normal as to time and quantity until about two years after the birth of the second child, then she noticed flowing was excessive and it lasted six or seven days.

Purpuric spots would appear on different portions of her body last a few days, and then disappear.

She did not consult a doctor until 1913 when she moved to Syracuse and consulted me regarding fallen arches. At this time no mention was made of any purpura spots or menstrual trouble. February 1914 she had acute appendicitis. I removed large acutely inflamed appendix which was glued to the

top to the ileum. Recovery was rapid and she returned home from the Homeopathic Hospital in two weeks. During or following the operation no trouble was experienced from hemorrhage, neither did any purpuric spots appear.

September 9, 1914, I was again called because of menorrhoea. The menses had at that time lasted eight days and the flowing was increasing in stead of abating. I was at first suspicious of miscarriage or if not that uterine polypus or fibroid. History and examinations revealed nothing and I was at a loss to account for the continued flowing. Doctor W. A. Groat was called to make a blood count and examination which was: Red blood-cells 4,000,000 coagulable decidedly retarded hemoglobin 40 per cent leucocytes 6,000.

There was profound secondary anemia with great reduction of blood platelets. Ergot and pituitrin had been given to assist in controlling hemorrhage with no effect. With the knowledge that the coagulating power of the blood was so greatly reduced horse serum was injected 10 ccm. every day for two weeks. After a few days the flowing began to decrease in quantity. Menstruation however continued for one period into another and finally stopped entirely before the third period. The administration of horse serum hypodermically was continued before and during the ensuing menstruation, the marked benefit in the condition of the blood and appearance of the patient. During the entire sickness, purpuric spots would appear in different parts of her body, these spots varying in size and appearance. They would appear generally one week following menstruation. At first the spots would be the small petechiae found scattered over her neck and arms. These would last several days, then the large ecchymotic patch could appear in different parts. There seemed to be no particular place where they would appear. These would last like any black and blue spot and then gradually fade away. The patient's habits of life were regulated, and proper hygienic instructions were given besides, general tonic treatment and the hypodermic use of iron citrate, etc. There was great improvement in the general condition. She could go and do as she pleased and enjoyed life in general.

April 8, 1915 the menses appeared as usual but the flowing was greatly increased. Vaginal examination revealed an erosion on the scar of the former laceration from which the blood was streaming. Local treatment was instituted to stop the hemorrhage. Silver nitrate 5 per cent solution was applied followed by packing with gauze saturated in 1:1,000 adrenalin solution. The horse serum was injected every day still I could see no alleviation of the symptoms.

Doctor Groat at this time made another blood examination as follows: Pale hemoglobin 30 per cent erythrocytes 600,000 coagulation decidedly retarded color index 0.8 leucocytes 5,400 secondary anemia.

The comparison of the last blood count with the first shows the same serious secondary anemia but to a much greater degree. It also revealed the fact that she was nearly exsanguinated. Her skin was as white as the sheets of her bed, the mucous membranes of her mouth and lips were as white as her skin. The case now assumed very alarming proportions. She was in a condition of shock most of the time, had breath hanging, then she would feel faint. Her body and face were covered with cold perspiration.

At the suggestion of Dr. Meader, coagulase was tried, still the flowing continued. She was literally bleeding to death. At this stage eight ounces of human blood was obtained from her husband and injected. This seemed to modify the serious symptoms a great deal. The flowing continued irrespective of treatment. Operative interference was advised against, still I could see this continual hemorrhage coming from the erosion on the cervix. Operation was decided upon and the uterine arteries were tied off followed by curettage. The hemorrhage was rather severe, but after the application of pure carbolic acid it flowed immediately with application of alcohol the uterus packed with gauze saturated in a solution of adrenalin 1:1000 the hemorrhage ceased. The operation was very well borne.

Human blood serum was injected as often as I could obtain same from husband. Scrapings of uterus were sent to Professor Steensland of Syracuse Medical College for pathological examination as I felt possibly malignancy might have some bearing on the case. Professor Steensland reported the condition innocent.

Following this operation which was performed at the patient's home, purpuric spots covered her whole body and lined the mucous membrane of her mouth, nose and throat, also many hemorrhagic spots appeared in the vagina. During this time she had frequent nose bleeds which were very difficult to control, also if she would brush her teeth especially hard so as to erode a small particle around a tooth, this would bleed perhaps twelve or twenty-four hours.

The cervix presented such a large stellate laceration that in my opinion it would very soon undergo degenerative changes and I considered this to be one of the chief causes of the menorrhoea.

I decided to amputate as soon as the condition of the patient warranted.

June 16 patient was removed to the Homoeopathic Hospital and on June 17 I amputated the cervix. Convalescence was untroubled and she returned home in two weeks. The menses appeared every twenty-eight days at first and were rather

prolonged and excessive, lasting about ten days. The condition has materially improved until now the entire duration is five days. One week following the cessation of menses small petechiae appear on different parts of her body. There is no pain or tenderness, no symptom of feeling weak and no inconvenience of any kind. The spot last a few days and then disappear.

She has gained in weight, weighing 140 pounds and looks the picture of health. She is able to go and do all the house. Examinations of the blood still show slight anemia with some reduction of blood platelets.

Purpuric spots also appear, they have before but the quantity is much smaller. The treatment now consists of proper hygiene and intravenous use of iron.

I have every reason to believe that this case will entirely recover, improvement has been so great and is steadily progressing.

To summarize: The laceration of the cervix in this case produced a subinvolution of the uterus, thus predisposing to increased and prolonged flowing and reducing the quality and quantity of the blood as a whole. The condition lasting over several years produced vascular disease. The vascular change seemed to have affected the power of the blood to coagulate at the proper time. Blood examination shows that it is the lack of blood platelets that produce the condition. The vascular disease is given by some writers as the first and primary cause of the disease. Constituents of the blood were taken away from time to time faster than the forming elements could supply them. Resulting from this we have a slowing of the blood stream and finally stasis with the formation of thrombosis and pigmentation.

The appearance of the petechiae and ecchymotic patches following menstruation show that at that time the coagulation power of the blood is at its lowest point, consequently I believe the treatment at this particular time should be to supply if possible the loss of blood by the direct transfusion method, namely the method of Richard Lewisohn alluded to in the early part of this paper.

THE RELATION OF THE ENDOMETRIUM AND OVARY TO HÆMORRHAGE FROM MYOMATOUS UTERI¹

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THE commonest and perhaps the most important symptom associated with uterine fibromyomata is undoubtedly hæmorrhage either in the form of menorrhagia or metrorrhagia. It has been the aim of many investigators to arrive at some definite explanation to account for this hæmorrhage but as yet no conclusive evidence in support of the various theories has been advanced. Hyperplastic changes in the endometrium have been noted as a common occurrence associated with bleeding and fibroids and consequently these conditions have been correlated by some authors. Others have attempted to link the hæmorrhage with inflammatory changes either in the endometrium or in the wall of the uterus. As would seem natural, because of the size and situation of these tumors mechanical causes, as pressure or obstruction with dilatation of the vessels, have been assigned an important rôle in the etiology of the hæmorrhage. One important organ, however has been neglected, but in the light of recent contributions to the physiology of menstruation and of the demonstration of amenorrhœa produced by the X-ray in treating fibroids and other conditions, the definite part played by the ovaries in the causation of hæmorrhage must be emphasized.

A brief review of the more important literature illustrates the various theories that have been advanced and shows how little attention has been directed to the study of the ovary as a possible etiological factor.

Von Campe (1) studied sixteen cases of fibromyomata, and found hypertrophy of the endometrium which he believed to be due to the presence of the tumor. Wyder (2) in an examination of twenty cases of fibromyomata noted the frequency of the endometrial hypertrophy and believing it to be inflammatory called it endometritis glandularis. He believed that this change in the mucosa had no relation to the hæmorrhage. He found

in those cases in which there was a concomitant hæmorrhage that an interstitial inflammation was present and suggested that the inflammatory condition was the cause of the hæmorrhage as well as the cause of the hypertrophy of the mucosa. His pictures, however do not show a true interstitial inflammation.

In the cases investigated by Uter (3) the same hypertrophy of the mucosa was noted and for the first time was considered apart from the tumor proper. The idea was advanced that some external irritation the same that in the musculature causes a circumscribed connective tissue overgrowth, produces an overgrowth of the mucous membrane.

However to disprove that the tumor produced the endometrial overgrowth, Cornil (4) demonstrated that the hypertrophic change was more commonly associated with small than with large myomata.

In an attempt to ascertain if the situation of the tumor had any effect on the mucosa, Schmal (5) analyzed fifteen cases and found that in subserous tumors the mucous membrane may be normal or hypertrophied while in the interstitial and submucous ones the endometrium over the tumor usually is atrophic elsewhere it is hypertrophic.

Semb (6) from a careful examination of fibroid tumors considering especially their situation the type of mucosa and the amount of hæmorrhage concludes that the commonest change in the mucosa associated with fibromyomata is hyperplasia. There may however be changes of a secondary nature such as inflammation or atrophy from pressure. He believes also that the hypertrophy of the uterine walls and vessels and the pressure of the tumor on the veins may cause the hæmorrhage.

With the work of Hiltachman and Adler (11) on the cyclical changes in the mucosa, it was necessary to study the effect of the

tumor formation on the normal menstrual cycle. Frankl (1) was the first to investigate the endometrial changes in myomatous uterus in relation to the normal menstrual phases. In the subserous and pure interstitial types of tumor he found that there were no changes in the endometrium that could not be included in the normal menstrual rhythm. In only one case was there a hyperplasia of the mucosa with rather marked oedema which latter condition was believed to be due to mechanical interference with the circulation. The interstitial tumor with a tendency to grow toward the endometrium showed abnormal variation in the cycle and the growing toward the mucosa likewise did not disturb the normal phases. In numerous instances he found a moderate thickening of the mucosa due to oedema and in other instances where the tumor projected into the uterine cavity he found pressure atrophy of the endometrium.

Clark (8) examined a number of fibromatous uteri and studied especially the circulatory apparatus by means of injection experiment. He came to the conclusion that the situation of the tumor and its consequent mechanical interference with the circulation was the main factor in causing the atypical hæmorrhage.

An analysis of the foregoing work shows how at variance the different theories are. Most of the investigators however have found that the mucosa is often hypertrophic some attaching to this an etiological significance in relation to the hæmorrhage while others imply regard the hypertrophy as a coincidental finding.

While von Campe (11) believed that the hypertrophy was due to the presence of the tumor Cornil (4) was able to show that the size of the tumor had nothing to do with the hypertrophy and that the larger the tumor the less likely was one to find a hypertrophic mucosa. This seems to throw considerable doubt on the theory of von Campe.

Frankl's contention that the thickening of the mucosa is due to oedema is not borne out by histological examination microscopically one can see not only oedema and congestion but hyperplasia and hypertrophy of both the glandular elements and the cellular constit-

TABLE I.

Age	Location of tumor	Menstrual history	Endometrium	Adenomyosis
25	Small	Normal	Normal	None
30	Small	Normal	Normal	None
35	Small	Normal	Normal	None
40	Small	Normal	Normal	None
45	Small	Normal	Normal	None
50	Small	Normal	Normal	None
55	Small	Normal	Normal	None
60	Small	Normal	Normal	None
65	Small	Normal	Normal	None
70	Small	Normal	Normal	None
75	Small	Normal	Normal	None
80	Small	Normal	Normal	None
85	Small	Normal	Normal	None
90	Small	Normal	Normal	None
95	Small	Normal	Normal	None
100	Small	Normal	Normal	None

uents of the stroma. The conclusions of Clark that the hæmorrhage is due to a mechanical condition will be discussed later but we believe that this theory of mechanical obstruction is not the entire solution or even the most important factor.

In an attempt to correlate these various theories especially in the light of recent contributions to the physiology of menstruation and its relation to corpus luteum evolution I studied seventy five fibromatous uteri representing all types of tumors and presenting various symptoms. In all the cases the menstrual history was accurately investigated. In sixty cases the adnexa were also examined. Of the seventy five cases fifty gave a history of menorrhagia, some few also having metrorrhagia.

If we analyze the histological changes in these fifty cases we find that in thirty six or 72 per cent the mucous membrane of the uterus showed hypertrophy irrespective of the phase of the normal menstrual cycle. In one case the mucosa was not examined but an adenomatous polyp was present the glandular elements of which had the same charac-

TABLE II.

N of Cases	Situation of Tumor	Condition of Mucosa		
		Hypertrophy	Interval	Atrophy
1	Intramural			
3	Intramural submucous and			
	intramural subperitoneal	4	5 (polypa)	
	Subperitoneal			
	Intramural polyp	4	with polypa	
	Intramural metastasizing	4		
5	Total	9	4 (polypa)	

teristics as those to be described as typical of the hypertrophic endometrial condition.

In three instances there was an atrophy of the mucosa associated with large tumors, due in all probability to pressure, and in ten instances the endometrium was in the resting or interval stage though in two of these it approached the hypertrophic picture. In other words the most common condition found in the mucosa in the bleeding cases is an hypertrophy.

A closer investigation of those cases that had abnormal bleeding and did not show the typical picture in the mucosa, is instructive. Of the thirteen cases that showed abnormal bleeding and did not present the usual hypertrophic mucosa, five showed a condition of slight hypertrophy and edema with some tortuosity and dilatation of the glands. In other words a mild attempt at the usual picture. Three cases had atrophic mucosa associated with large tumors. The atrophy however occurred over the tumors and on the uterine wall opposite them, where the question of pressure undoubtedly played a prominent part, while the mucosa between the tumors showed decided hypertrophy. Five cases presented the typical interval or resting mucosa. In these five cases we have no explanation to offer for the absence of the hypertrophy. An analysis of Table I will show how absolutely independent the mucosal change is of the situation of the tumor and also of its size.

Of the twenty five cases in which the

menstrual history was normal Table II illustrates the relation between the situation of the tumor the menstrual cycle and the condition of the mucosa.

In this group of cases we have but nine or 36 per cent that presented the hypertrophic change and fourteen or 56 per cent showing an interval stage. In two cases no examination was made of the mucosa there being present in these instances adenomatous polyps. Of the nine cases with normal menstrual histories in which the mucosa was hypertrophic one was menstruating on admission. Seven were operated upon at the time of the normal premenstruum. One a patient of 40 had amenorrhea for four months. Of this group only the last case cannot be explained as due to physiological causes.

In other words irrespective of the size and situation of the tumor in those cases giving a history of metrorrhagia or menorrhagia and irrespective of the phase of the menstrual cycle we find a markedly hypertrophic mucosa. It is not edema alone for all the elements of the endometrium take part in the change. The glands are tortuous distended often cystic and sometimes increased in number. The cells lining them are large with pale staining protoplasm and contain basal or centrally placed nuclei dark staining and oval in shape. The cell border toward the gland lumen is often raised in the form of a little cap or knob which is granular and when stained by selective dyes shows the same tinctorial characteristics as the secretion which is almost always found in the gland lumen.

The cells of the stroma are somewhat enlarged and pale the nucleus small round or oval deeply staining and centrally placed. Where there is much interstitial edema the cells are separated for a fair distance but in the absence of edema the cell bodies are barely distinguishable and the cells closely crowded together. There are no evidences of inflammatory reaction as a rule, though occasionally one may find inflammatory cells. Blood extravasations are found though not often. These are situated under the mucosa or in the interstitial tissue.



1 Normal premenstrual hypertrophy

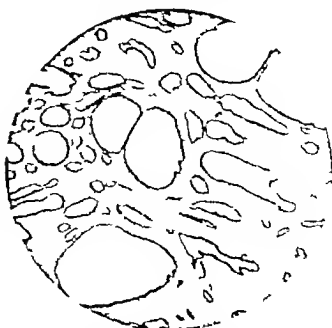
The entire histological picture resembles very much the changes one finds in the mucosa during its normal premenstrual phase and it seems reasonable to suppose that the same stimulus—namely some ovarian activity is the cause of the hypertrophy found associated with fibroid. In the uterus from the cases of essential uterine hæmorrhage (Geist 10) we find a similar hypertrophy of the mucosa and this type of hæmorrhage is now generally conceded to be due to a disturbance of the balance of the endocrinous glands.

In an effort to ascertain if there were any definite lesion in the ovaries the ovaries in fifty-five cases were also carefully examined. In thirty-eight there was a history of bleeding and in seventeen the menstrual history was normal.

TABLE III

Condition of ovaries in the 38 patients with pathological bleeding

With large corpora lutea	10
Of the size of corpora lutea of the size of a plum	
With normal ovaries	0
With atrophic, complicated by a dermoid	4
With inflammation of tube and ovary	5
Total	5



1 Mucosa from the uterus containing an antral cyst. Atypical dilated glands. Last period 11 days

TABLE III A

Condition of ovaries in 6 patients with pathological bleeding and hypertrophy of mucosa

With large corpora lutea	10
Of the size of corpora lutea of the size of a plum	
With normal ovaries	
With cysts	
With inflammation of tube and ovary	4
Total	4

TABLE III B

Condition of ovaries in 12 patients with pathological bleeding and no hypertrophy

With large corpora lutea	3
With normal ovaries	
With atrophic dermoid	
With inflammation of tube and ovary	1
Total	2

TABLE IV

Condition of ovaries in 11 patients with normal menstrual history

With large corpora lutea	0
With normal ovaries	0
With cysts of 13 mm. or less in dermoid	5
With inflammation of tube and ovary	1
Total	1



FIG. 3. Mucosa from uterus containing submucous fibroid. Atypical glands mimicking the premenstrual phase. Last period one week ago.

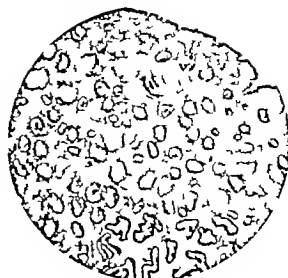


FIG. 4. Mucosa from uterus containing submucous fibroid. Atypical glands mimicking the premenstrual phase. Last period one week ago.

TABLE IV A

Condition of ovaries in 7 patients with normal menstrual history and hypertrophic mucosa

With large corpora lutea

(microcyst)

With normal ovary

With cysts

Total

4

7

TABLE IV B

Condition of ovaries in 8 patients with normal menstrual history and no hypertrophy

With normal ovary

With cysts

microcyst, dermoid

With inflammation of tube and ovary

Total

5

8

In considering the adnexal changes in relation to the bleeding and to the changes in the mucosa we are struck by the predominance of one type of lesion in the ovary, namely the persistence of a large corpus luteum which is occasionally cystic. In sixteen cases or sixty-two per cent of the twenty-six with hypertrophy of the endometrium we found this condition of persistent corpus luteum and only in three instances were the ovaries to be classified as absolutely

normal. In the nine cases in which the mucosa was in the resting stage only two showed this ovarian change and in one of them there was a slight hypertrophy of the endometrium.

Of the seventeen cases in which the menstrual history was normal only two showed the large corpora lutea and in these there was a premenstrual change in the mucosa.

An analysis of the foregoing cases shows that when the mucosa is hypertrophic and pathological bleeding is present the ovary is grossly abnormal presenting either cysts, inflammation or most commonly a large corpus luteum often cystic in character.

We have seen that in the majority of cases of uterine fibroids irrespective of their size or situation, when the condition is associated with pathological bleeding the mucosa presents a hypertrophic condition resembling that seen in the normal premenstrual phase of the menstrual cycle. The recent work of Ruge and Meyer (9) has shown that the normal premenstrual phases correspond in time to the height of development of the corpus luteum and that the hypertrophy of the mucosa is probably due to ovarian activity or more specifically to corpus luteum activity. We thus have reason to believe because of the resem-



Fig. 1. Menstrual phase. Fig. 2. Premenstrual phase. Fig. 3. Menstrual phase. Fig. 4. Premenstrual phase.

blan e between the two pictures is the mu a that the are stimulu perhaps perverted by the ause of the hypertrophy of the mu a in the fibril ase. In most of the ase where atrophy was found the nition will be ac counted for either by pressure of molar e tu mor or by anitis. In two of the ase where there had been pressure atrophy we found in the spaces between the tumor a hypertrophic condition which resembled that usually found in the bleeding cases. It is not possible to account for the change in the mucosa purely on the basis of a vascular obstruction for in cases with subperitoneal and small intramural tumor where there is no marked vascular obstruction we find the same hypertrophic change of the endometrium associated with pathological bleeding. Furthermore the change is not purely a passive edema and engorgement but is an active increase in size and sometimes in number of the glandular and stroma element.

Again in hybrid cases where a normal menstrual history is obtained we find the mucosa corresponding to the normal phase in the menstrual cycle while in other cases presenting tumor of the same size and situation in which atypical hemorrhage is the prom-

inent symptom the mu a in the great majority of instances is hypertrophic.

In the instances where we were led to expect the hypertrophic mu a it usually were embarrassed by finding a lining not in line. Usually there was an atrophy of the mu a which could be accounted for by pressure from large tumor and in a few instances localized hypertrophies in the form of polyp were encountered whose histological constituent closely resembled those of the hypertrophic mucosa commonly associated with the bleeding cases. We are led to suspect that in many instances of bleeding in which the only lesion found is a polyp the bleeding is really of ovarian origin and that the polyp represent a localized hypertrophy due to disturbed ovarian function. Because of the resemblance between the histological picture of the hypertrophic mu a associated with the bleeding and that normally present in the premenstrual phase which latter condition has been shown to depend on some ovarian function probably the corpus luteum we are led to believe that the change seen in the bleeding hybrid cases is an expression of disturbed ovarian function and that the bleeding and hypertrophic mu a

have a common or related etiological factor. In further support of this theory can be advanced the evidence of X ray therapy. It is established that the X ray treatment of bleeding fibroids quickly stops the hemorrhage long before the size or situation of the tumor is influenced. We also know that it is the ovary and more particularly the more mature follicles that are first affected by the ray and consequently feel justified in regarding not the tumor but the ovary as the important factor in the cause of the bleeding.

Supportive evidence pointing to the activity of the ovary as the source of the hemorrhage, is found in the clinical behavior of fibroids associated with pregnancy. The hemorrhage from fibroids during pregnancy in most instances, though the tumor in its size and situation remains unchanged ceases. The ovarian activity is to a great extent in abeyance during pregnancy and it seems that in view of the previous discussion we are justified in assigning the important rôle in causing the cessation of the hemorrhage to the functional inactivity of the ovary.

To summarize, we can say that in most of the cases of fibroid uteri associated with pathological bleeding we have a hypertrophic condition of the mucosa. The ovaries in these cases vary from the normal, there being present most often a large corpus luteum occasionally cystic. These findings seem to us very significant in view of the fact that

the ovarian influence is of primal importance in regulating the normal hemorrhage from the uterus and it seems reasonable to suggest as a possible etiological factor for the atypical hemorrhage associated with fibroids, disturbance in the function of the ovary perhaps of the corpus luteum.

I wish to thank Dr F S Mandlebaum, director of the laboratory for the privilege of studying the material and for the excellent photomicrographs which he made and also to express my appreciation to Dr J Brettauer and Dr F Krug for their kindness in allowing me the use of the clinical data.

(The photographs illustrate variations, from the normal picture as seen in the uterine endometrium associated with fibromyomata. The varieties pictured represent types of hypertrophies where one would normally expect a resting stage.)

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SARCOMA OF THE SCAPULA HISTOLOGICAL DIAGNOSIS MADE BY STUDY OF BLOOD ASPIRATED FROM PULSATING PORTION OF THE TUMOR

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THE cytological study of the various exudates is a well recognized laboratory procedure and has a proved value in distinguishing between neoplasms and various types of inflammatory processes affecting the linings of the serous cavities. That a similar study of fluids

aspirated from tumor masses may have a like value seems possible from the instance I shall relate.

Among the specimens coming to the laboratory recently was ten cubic centimeters of fluid blood. The accompanying request card stated that the fluid had been aspirated

ROYCE SARCOMA OF THE SCAPULA



Fig 1 Photograph showing tumor of right hould

from a tumor of the houlder which was tentatively diagnosed as sarcoma and asked for the nature of the fluid. The fluid was allowed to stand over night at room temperature. The next morning it was clotted. Ten per cent formalin was added without disturbing the clot. The following day a portion of the clot was removed and imbedded in paraffin. Sections from this block stained with haematexin and eo in present beautiful pictures of island of sarcoma-cells imbedded in a matrix of fibrin and red cells. The cells are of the small round variety and mitotic figures are frequently seen.

The history shows the patient to be a white male 19 years of age single of good habits and without previous illness. The family history is irrelevant except for the vague statement that his mother died of a tumor of the stomach. He complains of pain and swelling of the right houlder. The duration of

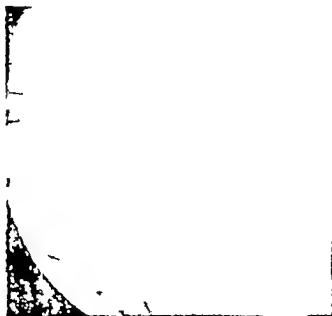


Fig 2 Roentgenogram showing cavity formation with in the tumor

the tumor covers four years and date to an injury of the houlder while coasting. The growth has been slow but there has always been more or less pain.



Fig 3 Photomicrograph showing an island of tumor cells imbedded by red blood cells

UNILATERAL HÆMATURIA ASSOCIATED WITH FIBROSIS AND MULTIPLE MICROSCOPIC CALCULI OF THE RENAL PAPILLÆ

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DURING the past decade there have been many articles written on unilateral hæmaturia and like all other unsolved pathological problems, there have been quite a diversity of opinions expressed.

At the meeting of this society in 1912 the writer presented a paper¹ setting forth a résumé of the various pathological interpretations published up to that date and related a series of experiments which helped to eliminate the acutely developing vascular lesions as a causative factor of unilateral renal hæmorrhage.

A large number of careful observers have reported the evidences of chronic inflammation in sections of kidney tissue removed from the type of case under consideration and our studies of personal cases before and since 1912 have confirmed the belief that chronic

inflammatory changes are the principal factor in the production of unilateral hæmaturia.

We also advanced the theory in the paper above mentioned that chronic inflammatory changes raise the local vascular tension to the point where rupture of the capillaries occurs with a resulting hæmorrhage.

The following case is presented not with the idea of drawing therefrom any definite deductions but for the purpose of explaining and defining our interpretation of the pathology present in this particular case.

C. H. J. male, age 70 occupation, school-teacher family past and social history negative. Present history—Seven years ago he first observed the presence of blood in the urine. This occurred at varying intervals until three years ago since which time there has been blood continuously present in the urine.

The patient has never suffered a particle of colic or pain, nor has there been associated any spells of fever. The amount of urine passed has always



Fig. Camera lucida drawing. Leitz obj. 6, oc. Three calculi are shown surrounded by proliferation of connective tissue. At *b* are seen dilated capillaries packed with blood-cells. *c*, A papillary duct cut in its long axis.

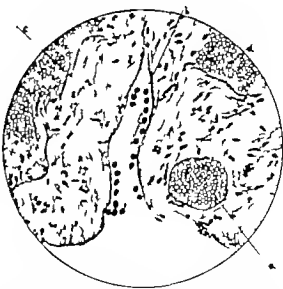


Fig. Camera lucida drawing. Leitz obj. /6 oc. Taken from section through the apex of renal pyramid. At the enormously dilated venous spaces are seen. The connective-tissue overgrowth at *b* is marked. At *c* is seen papillary duct cut in its long axis.



Fig. 3. Microphotograph X 88. Section through tip of papilla. On free surface is seen a ruptured capillary which still contains some blood cells. T cells are also shown.



Fig. 4. Microphotograph X 15 (taken from same section as Fig. 3) shows five calculi, numerous dilated capillaries, and considerable connective tissue overgrowth.

been plentiful but the patient gives the history of persistent constipation. There had been a perceptible loss of weight and the patient looked very anemic. On physical examination neither kidney was palpable and there was no tenderness over either loin space. X-ray examination was negative for stone and the microscope revealed an abundance of blood in the urine but no pus, no crystals and no casts.

Cystoscopic examination showed a normal bladder with bloody urine spurting from the right ureter and clear urine from the left side. No resistance was met with either ureteral catheter but the separate specimen showed with the microscope clear urine from the left kidney and bloody urine from the right side. Functional phthalein tests showed a normal output from the left side and a marked reduction from the right kidney. Bacteriological studies of the separate specimens was negative from the left kidney but showed a few colon bacilli from the right kidney.

Bacteriological study of the bladder specimen also showed the presence of colon bacilli.

Operation was decided upon because the writer has observed several of these cases relieved by section of the kidney from pole to pole and down to the pelvis in the absence of any demonstrable lesion to the naked eye.

At operation the kidney seemed normal in appear-

ance and size and no stone or new growth could be demonstrated. Upon bisection the cortex and parenchyma showed nothing definite but every single papilla was intensely congested and the tip of every papilla presented a cherry red appearance which coincided macroscopically with the classical description of an angioma.

The writer had never before done a nephrectomy for this condition but it did not seem reasonable that bisection with suture could relieve this particular case nor did it seem possible that the experience of Fenwick¹ could be applied to multiple angiomas of every papilla.

Keeping in mind the normal functional test of the left kidney, nephrectomy was accordingly done and herewith is appended the pathological report by Dr. Wm. DeB. MacNider of the University of North Carolina.

Gross appearance. Kidney in 10 per cent formalin is 4 $\frac{1}{2}$ x 3 x 1 $\frac{1}{2}$ inches. The capsule is easily removed, not adherent and the surface is smooth and normal in color. The cut surface shows a normal relation of cortex and medulla.

The cortex is uniformly pale. All of the pyramids appear congested. This congestion macroscopically takes the form of streaks running in the long axis of the pyramids. In several instances these streaks lead to areas of congested reddish



Fig 5. Microphotograph, X55 showing large section of papilla with ruptured capillary and much hemorrhage on free surface. Also large number of dilated sinuses scattered throughout section.

brown in color which surround and cap the apices of the pyramids. All of the renal papillae show marked congestion.

Microscopic pathology There is no increase in intertubular connective tissue and no adhesions of the vessels. The glomeruli do not show any increase in capsular connective tissue. There is, however, quite a uniform increase in connective tissue cells between the capillary loops of the glomeruli. This connective-tissue change is likely of recent development because connective tissue fibers have not been laid down.

The capillaries in this area are intact, hence, there is no evidence of the hematocrit having originated from a ruptured capillary loop or loops. The epithelium of the cortex appears normal. The tubules in the cortex occasionally contain granular material which shows an absence of red blood-cells.

Sections were made passing through the papillae and pyramids both in the long axis of the pyramids and at right angles to this axis. Such sections show the epithelium of the tubules in this zone of the kidney to be fairly normal. In the region of the papillae there is a distinct increase in intertubular connective tissue. This increase is not uniform in its distribution.

Located in the region of the papillae and principally between the tubules but rarely inside a tubule are numerous calculi which are microscopic

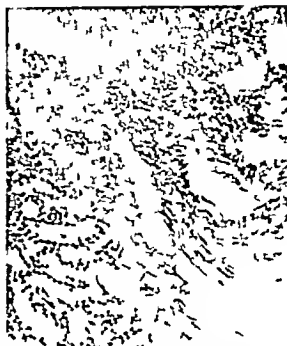


Fig 6. Microphotograph, X8 of same section as Fig 5 showing the dilated and ruptured capillary containing few red cells and abundant hemorrhage on the surface of the papillae.

In size. Surrounding and in the region of such concretions there is an unusual overgrowth of connective tissue. In this connective tissue, usually between the tubules, the small veins and capillaries are hugely dilated into venous sinuses.

Many of the small calculi lie in close apposition to these vascular sinuses. Such sinuses are well filled with blood. In such cases the tubules may be compressed by either the dilated capillaries or the intertubular calculi.

All of the papillae show dilated capillaries. Net work on the surface many of which were ruptured with free blood escape. These were the small varicosities were evident in the surface of the hemorrhage.

The origin of these varicosities is not clear. It would seem, however, that the numerous though small calculi added by the connective tissue they had originated, succeeded in causing an obstruction to the venous return and a subsequent dilatation of the capillaries with resulting varicosities.

The writer does not believe that deductions can be drawn from one case. The facts here presented would, however, lend weight to the theory of those who believe chronic

inflammation to be the cause of unilateral renal hæmorrhage

Briefly to summarize we have a case of so-called essential hæmaturia which flows in the kidney removed that macroscopically the only part of the organ involved in a pathological process is the papillary area

Microscopically the cortex and medullary portion is pathologically negative while the papilla show definite lesion as follow

(1) Numerous microscopical calculi (2) overgrowth of connective tissue (3) hugely dilated capillaries (4) calculi lying in close apposition to dilated capillaries (5) dilated capillaries in a net work on the free surface of papillæ many of which are ruptured with free blood escaping

It is not the part of this paper to discuss the question of infection hæmatogenous or otherwise whether the stones were the beginning of the process whether the connective-tissue overgrowth was the cause of the varicosities or in any way to theorize concerning the causative factors involved but to report accurately our findings and partly show them in the accompanying illustrations

Finally after five years of study of so-called essential unilateral hæmaturia both clinical and experimental together with an intimate knowledge of the literature this is the first instance known to us where the definite

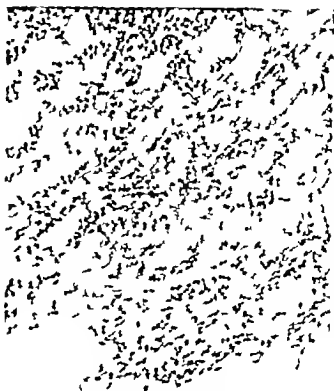


Fig. Mic. phot. graph No. 152. Section through tip of papilla showing a dilated capillary cut in its long axis. It was filled with blood but ruptured on the free border of the papilla

source of the hæmorrhage and the probable cause thereof in a case of symptomless unilateral renal hæmorrhage is shown

THE PROCESS OF REPAIR IN WOUNDS OF THE SMALL INTESTINE

B JOHN E. McWHORTER, M.D. A. P. STOUT, M.D. AND CHARLES C. LILL, M.D. NEW YORK

IN accordance with a general scheme suggested by the Director of the Surgical Laboratory to study the phases of repair in the body systems we have selected the problem of repair in the gastro-intestinal tract with the hope that data might be obtained that would be of practical value in the post-operative care of intestinal suture. The small intestine was chosen first because the undergraduate course in operative technique afforded abundant material. Later we hope to supplement this work with similar observations on the large intestine and stomach.

The objects of these experiments are *first* the determination of the hydrostatic pressure that a repairing intestinal wound will withstand *second* the effect of transverse division and suture on segmentation and *third* an observation of the gross and microscopic phenomena of repair.

HISTORY

In 1887 Senn (1) described experiments on the production of obstruction, volvulus, strangulation and intussusception together with the results obtained from resection and subsequent suture of the intestine. During the course of his experiments he reported, though not in detail, a few of the processes of repair. In one series of experiments he produced obstruction by tying the intestine near the ileocecal valve. Three to seven days later he performed an ileo-ileostomy or ileocolostomy using decalcified bone plates. One of his dogs died at the end of 24 hours. When the intestine was subjected to hydrostatic pressure no leakage occurred at the site of suture. He believed that absolute physiological rest of the intestine was necessary for perfect healing. He also reported that scarification or chemical irritation of the peritoneum produced adhesions that were both firmer and more rapid in their development than those following simple apposition of serous surfaces by suture. After mechanical or chemical irritation of the peritoneum

an outflow of blood and lymph appeared on the surface. He also noted that gross vascularization began after 40 hours. At 15 days the mucosa was almost but not quite completely regenerated.

In 1896 Mall (2) presented a detailed picture of intestinal repair. He noted that within a few hours after the suture the serous surfaces were adherent and he believed that fibrinous union took place before the operation was completed. At the end of 24 hours the inverted cut edges of the intestine showed extensive coagulation necrosis. After 48 hours in the sulci between dead and living mucosa epithelial cells of embryonic type were proliferating in all directions. At the end of 6 days there was a downgrowth of glands into the submucosa, probably because the needle tore through the bottom of the crypts. Many of these glands were cystic. At the end of 14 days the approximated layers of the muscular and submucous coats were united by firm fibrous tissue. The denuded surfaces of the mucosa were covered with granulation tissue until the crypts and villi had regenerated. On the fifteenth day the mucosa was almost completely regenerated. After 24 days regeneration was complete. When the mucosa had healed the inverted parts unfolded and the intestinal wall straightened out into a smooth unbroken line. At the end of two months, all the coats were fully regenerated.

He divided the processes of healing into four stages: *first* the immediate fibrinous union of the serous surfaces; *second* the destruction of the parts protruding between the flaps of mucosa; *third* the regeneration of the mucous membrane; *fourth* the straightening out of the suture line.

Gould (3) confirmed most of Mall's findings, but noted in addition that the plastic exudate uniting the serous surfaces extended from 3 to 5 cm. beyond the line of suture. At the end of three days some 3 to 5 mm. of fatally injured mucosa had sloughed and the submucosa was edematous. Many new

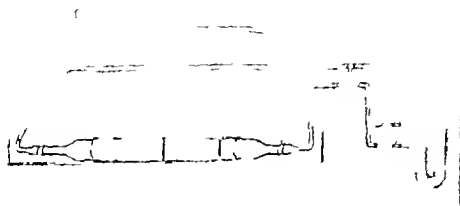


Diagram 1. Intestine

connective tissue cell appeared in the clot between the approximated serous surfaces and complete organization took place at the end of the eighth day. In one case he found that the denuded surface was covered with embryonic epithelium at the end of eight days. After 21 days the denuded area was completely covered by the newly formed mucosa but the muscularis mucosae had not developed. The muscularis was approximated by the contraction of the intervening scar tissue.

According to von Frey (4) a plastic exudate glued together the approximated serous surfaces of the sutured intestine. He made no direct statement relative to muscular regeneration although in his drawings of sections taken two days to four months after operation the muscularis had not regenerated.

Hoffman (5) showed that small defects in the mucous membrane of the stomach and intestine of dog healed completely. A defect of 1 by 1 cm had regenerated completely at the end of 32 days excepting for a small area about 4 mm in diameter. Larger defects were covered with a single layer of epithelium while very large defects were covered with granulation tissue.

Meek (6) reported that the longitudinal muscular coat of the cat's intestine regenerated in from 7 to 9 days after division and suture.

Cannon (7) in a discussion of the relative merits of end-to-end and lateral anastomosis gives his results from observations made on different animals one, four, seven and ten days after end-to-end union of the intestine. He found that in no case was the slightest evidence observed of stasis of the food in the region of the operation. In lateral anastomoses however he found at the end of ten days to two weeks a more or less complete blocking of the canal by accumulated hair and undigested detritus at the opening between the apposed loops.

TECHNIQUE OF OPERATIONS

The experiments were divided into two series: one upon the relatively normal small intestine and the other upon an intestine that had been previously injured.

Series 1. The animals in this series were dogs of various types, unselected and often poorly nourished. The operations were done by fourth year students who had had little if any previous operative experience. Each

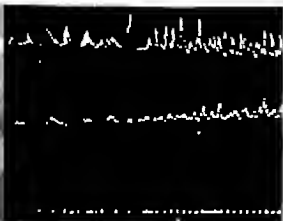


Fig. 4. Movement of circular coat of intestine one hour after end-to-end anastomosis. Upper tracing made by circular coat 95 mm. caudal to anastomosis. Lower tracing made by circular coat 5 mm. cephalad to suture. During contraction of the muscle lever moves upward. Lowest tracing three in minutes. Note change in speed of kymograph.

operation was supervised by an instructor who however did no part of the operation. There were three varieties of operations on the small intestine: the repair of enterotomies, lateral anastomoses, and end-to-end anastomoses. The method of suture varied somewhat, but as a rule an inner layer of through-and-through continuous or lock stitch was taken and this was infolded by some form of continuous seromuscular suture. The suture material was invariably white silk. Since the course is particularly designed to teach operating room asepsis, special care was taken to maintain as perfect a technique as possible. All the operations of exposing the lumen of the gut were done with a change of towels and instruments between the middle contaminated and the terminal clean stages.

The care of the dogs was as follows. The day before the operation the dogs were given a soap and water bath and the field of operation was cleansed of hair with barium sulphide mixture. All the operations were done in the forenoon and on that day the dogs received no food at all. The anæsthetic used in every case was ether. Following all operations the dogs were given as a routine water on the day of operation, milk and water the next day, and regular diet of bread, meat, and small bones on all succeeding days.

Series B. After completing the first series the objection was raised that the experiments were inconclusive since the operations were done on the normal intestine. Consequently we endeavoured to injure the gut by interfering with its blood supply before doing the suture operation. Some difficulty was encountered before a satisfactory method was found. Ligation of the mesentery which included the vessels supplying a loop of intestine a foot in length had apparently no effect on the viability of the gut. Injecting liquid paraffin into a branch of the mesenteric artery or vein was a little more successful but could not be controlled. Sometimes a loop became moderately hyperæmic but more often there was no effect at all or there was a general mesenteric thrombosis with gangrene and quick death. Finally a simple effective and easily controlled method was devised: a piece of half inch tape was tied about a loop of intestine just tight enough to cut off the venous return while still allowing the entrance of arterial blood. This simulates strangulation of the gut as seen in strangulated hernia, volvulus and like conditions. This preliminary operation was done twenty-four hours before the second operation which consisted of wide resection of the strangulated gut and end-to-end anastomosis. In this second series the preliminary operation was done by the experimenters and the resections and anastomoses were done in some cases by students, in others by the experimenters themselves. The method of anastomoses was that already described.

HYDROSTATIC EXPERIMENTS

Technique of experiments. The specimens of both series were handled in exactly the same way. The dog was killed or died at periods from 25 minutes to 144 days following the suture operations. The abdominal cavity was opened as soon as possible after death and a loop of gut was excised which included the area of operation and six inches or more on each side of it. This segment was then treated in either one of two ways. Some had one end tied off and a glass syringe fastened into the lumen at the other. Water was then introduced until the loop was considerably

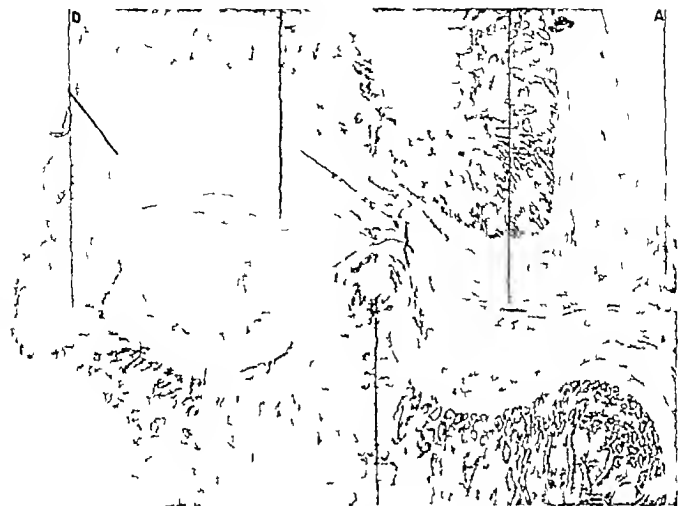


Fig. 1. Intestinal repair apparatus. One hour after operation. Surgical technique: A, suture line; B, suture line; C, suture line; D, coagulum filling space between intestinal walls; E, suture line; F, suture line; G, suture line; H, suture line; I, suture line; J, suture line; K, suture line; L, suture line; M, suture line; N, suture line; O, suture line; P, suture line; Q, suture line; R, suture line; S, suture line; T, suture line; U, suture line; V, suture line; W, suture line; X, suture line; Y, suture line; Z, suture line.

distended. During the distention the suture line was under observation for leakage.

The other specimen were subjected to measured pressures as follows. After removal from the body the specimen was immersed in warm Ringer solution and glass cannulae were inserted into the lumen at either end and securely tied in place. While the gut was still submerged both ends were connected to the apparatus by means of rubber tubing. One of the connected ends (Fig. 1 a) led to a water bottle (Fig. 1 b) containing colored Ringer solution. This bottle was hung from the ceiling and by means of a rope and pulley could be raised and lowered to any desired height thus giving various hydrostatic pressure. The rubber tubing at the other end (Fig. 1 c) was attached to the short arm of the water manometer (Fig. 1 d). With the

intestine connected to the apparatus the air was expelled from the lumen of the intestine as well as from the various lengths of tubing by raising the water bottle A by pass (Fig. 1 e) with stop-cock in front of the manometer allowed for the escape of air without the disturbance of fluid level in the manometer tubes. Next the water bottle was brought to the level of the intestine and the stop cock was opened. The level of the fluid in the long arm (Fig. 1 o) of the manometer was noted and marked zero particular care being taken to see that this point did not represent either negative or positive pressure.

To obtain positive pressure within the lumen the water bottle was gradually raised to any desired height and the pressures were calculated by measuring the height to which the fluid rose in the long arm. Any leakage

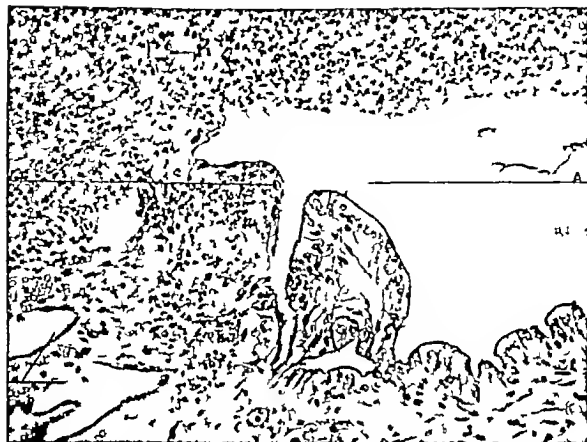


Fig. 3. End-to-end enterostomy 14 hours. Surgical Pathology V 34. A Sutures between lumen mucosa and unfolded cut edges of intestinal coat. B newly formed epithelial line.

was at once detected for the Ringer's solution in the water bottle was colored blue with *acridin blue* a vital stain.

Results of the hydrostatic experiments. As may be seen by referring to Tables I and II thirty two specimens in Series A and B were subjected to various degrees of hydrostatic pressure from within the lumen. As the results in the two series were the same they will be considered together. Six leaked. Of the twenty six that showed no leakage nineteen followed suture of supposedly normal gut while seven followed resection of gut showing more or less severe vascular changes. The experiments were done at from twenty five minutes to 144 days following the suture operations. The measured pressures which the specimens withstood without leakage varied from 350 to 1400 mm. of water (one-

half to two pounds per square inch). That these pressures far exceed any that under ordinary circumstances exist within the living intestinal lumen may be readily appreciated by considering for a moment the normally functioning intestine.

The actual amount of positive pressure in the intestinal lumen *in vivo* is unknown. The pressure varies considerably even under normal conditions for during the intervals of digestion when the intestine is quiescent, the pressure is practically zero. During digestion however with the passage of the bolus along the canal the internal pressure at any one time and upon any given area is certainly positive but the actual amount is relatively slight. Even under abnormal conditions of distention although the pressure is undoubtedly far greater than the average it



Fig. 4. I. d. t. n. e. n. t. n. t. m. n. e. l. a. l. P. a. t. h. o. l. o. g. y. N. o. 1. 1. S. e. n. n. u. l. t. e. c. 1. 1. m. a. n. d. k. n. o. w. n. d. r. e. B. d. n. o. k. e. d. n. a. n. d. t. h. g. r. a. n. u. l. a. t. i. o. n. t. i. s. u. a. n. d. t. h. n.

unquestionably never approaches anywhere near the amount to which the above tubulated specimens have been subjected.

Willis Andrews (8) working with ox intestine and human intestine freshly removed from the body found that they burst at an internal air pressure of from 6 to 10 pounds per square inch. Senn (8) experimenting on the cadaver in a case of enteritis found that the diseased bowel ruptured at an air pressure of $1\frac{1}{2}$ pounds per square inch.

Muller (9) in a recent article on the bursting strength of the alimentary tract found that in cats the average pressure necessary to rupture the jejunum was 28.2 pounds per square inch (1458 mm Hg) and the ileum was 4.8 pounds per square inch (1254 mm Hg). This pressure varied considerably in different cats but was uniform in the same individual. He further noted that the tear was linear and ran in the long axis of the organ and that the strength of the alimentary tract lay chiefly in the submucosa.

The six cases of leakage above recorded together with a number of similar cases examined but not included in the tables were with the exception of one case invariably

associated with local infection about the suture line or a general peritoneal infection. The one exception was that of a lateral anastomosis done by one of the students (Table I No. 1) and tested twenty-five minutes after completion of the suture operation and fifteen minutes after the death of the dog from the anesthetic. The leakage here was due undoubtedly to faulty operative technique. What the source of the infection was in the other cases could not be definitely ascertained. In many a visible hole leading into the lumen was present and in these cases the leak probably preceded and caused the infection. That other lesions without infection can be present in the intestinal tract without interfering with the repair is seen from cases seven and fourteen of Series A (Table I). These dogs died respectively of mesenteric thrombosis and intussusception and yet showed a resistant suture line. That very slight local infection is of no consequence is amply proved by the relatively enormous pressure that some of these specimens withstood though the microscopic picture was that of infection. Given however a marked infection whether accompanied by gross

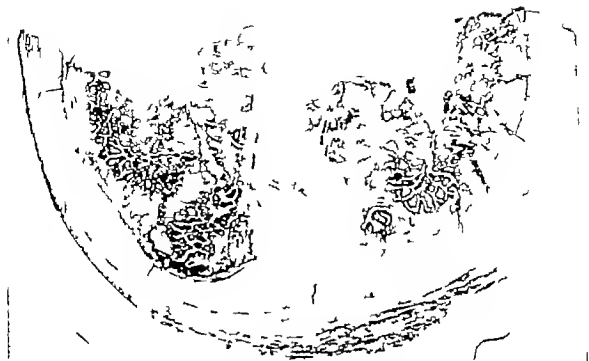


Fig. 5. Enterorrhaphy sixty day after operation Surgical Pathology \ 39 showing complete regeneration of mucous membrane and realignment of muscular coat

suppuration or not leakage will take place at pressures so slight that they cannot be recorded by the manometer

In connection with this work on the living intestine it is of interest to note the two following experiments. A dog was chloroformed and at death the small intestine was divided in two places and immediately joined by end-to-end anastomosis. One half hour later one of these sections was removed and subjected to pressure of 850 mm. of water without leakage. Two hours later the second section was excised and subjected to a pressure of 1250 mm without evidence of leakage

VIABILITY OF THE INTESTINE

It has been shown in a previous section that an Intestine can withstand within one hour after an anastomosis an internal pressure varying between 330 mm and 1400 mm of water. It seemed worth while to determine whether such operations as anastomoses interfered with the viability of the gut.

No better index of the viability can be

offered than a graphic record of the movements of a loop of intestine which includes an anastomotic suture. A preliminary experiment with a loop of dog's intestine one hour after the repair of an enterotomy showed that this operation did not interfere with the contractions of the longitudinal muscular coat. Such an experiment would not indicate whether the contractions were due to movements of muscle fibers in close proximity to the injury or to those fibers at a considerable distance from the site of operation

In order to determine the relative activity of smooth muscle near the site of operation and at a considerable distance therefrom the following experiments were devised

Immediately after the suture had been tested for its efficiency against internal pressure the cannule which had been tied into the lumen were removed and the loop of intestine was transferred to an oblong dish containing fresh, warm Ringer's solution. The loop of Intestine was then fixed by means of two sutures to a glass tube the ends of which were

TABLE I

Exp No	Surv P ch %	Time Post op	Type of Operation	Cause Death	Sex	Pre-re Flow (ml)	Min of A of I	Dist per 4 mm Inch
3207	5	20 min	Enterorrhaphy	Died in 11 min	Male			
3259	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m m		
3260	100	1 hour	Lateral anastomosis	Killed by bar	N	W m m m		
3261	100	1 hour	End to end anastomosis	Killed by bar	N	W m m m		
3262	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3263	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3264	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3265	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3266	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3267	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3268	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3269	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3270	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3271	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3272	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3273	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3274	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3275	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3276	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3277	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3278	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3279	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3280	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3281	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3282	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
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3284	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3285	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3286	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3287	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3288	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3289	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3290	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3291	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3292	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3293	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3294	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3295	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3296	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3297	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3298	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3299	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		
3300	100	1 hour	Enterorrhaphy	Killed by bar	N	W m m m		

bent at right angles. Exactly opposite the two original sutures two other stitches were taken and tied. One end of each of these threads was then passed over a pulley and connected to a recording lever which wrote upon the smoked paper of a slowly moving kymograph. The levers were properly weighted and wrote in such a fashion that when the circular muscle of the intestinal loop contracted the writing point moved upward; during the relaxation of the intestinal wall the writing point descended. Oxygen was supplied to the Ringer's solution which bathed the intestinal loop and the temperature of this solution was maintained at 38 to 39° C by means of a large water bath.

The position of the sutures varied in the different experiments so that we were able to study muscle within 5 mm of the site of operation as well as muscle 100 mm from the

line of suture. The accompanying illustration (Fig. 1A) is a graphic record made by the circular muscle of a loop of intestine which was excised one hour after an end-to-end anastomosis had been made. The lower tracing is made by the circular coat 15 mm cephalad to the suture; the upper tracing represents the movements of the circular coat 95 mm caudal to the anastomosis. The movements of the muscle 95 mm from the site of injury are powerful, regular and show very distinct tonus waves. The movements 15 mm from the injury are fairly regular and show less pronounced variations in tonus.

Though it is true that all the movements that we have recorded are comparatively small this may be accounted for first by the fact that these loops have invariably been exposed to a very high internal pressure and second to the fact that the dogs have received

TABLE II

Exp. No.	Surg. Post. No.	Time Post-op.	Cause of Death	Leak or N	Min. of Water Pressure	Lib. per Square Inch	Type of Preliminary Operation
		hour	Killed, chloroform	No	900		Strangulation with tape
	353	hour	Killed, chloroform	N	800		Strangulation with tape
3	3456	day	Killed, chloroform	No	660		Paraffin in mesenteric vessels
4	345	day	Killed, chloroform	N	660		Strangulation with tape
5	3468	day	Died peritonitis	Leak			Paraffin in mesenteric vessels
6	3469	days	Died general peritonitis	Leak			Strangulation with tape
	3473	day	Killed, chloroform	N	50		Strangulation with tape
8	3477	days	Killed, chloroform	No	50		Strangulation with tape
	3490	5 days	Died, general peritonitis	Leak			Strangulation with tape
10	3570	7 days	Killed, chloroform	N	1,000		Strangulation with tape

The times given above refer to the time elapsing between the second operation and the death of the animal. The second operation in every case in this series was an end-to-end anastomosis. Twenty-hour hours elapsed between the first and second operation in every case except experiment N 4, where only six hours intervened. The pressure in every case was measured by the water manometer.

no food for 12 hours previous to operation. This latter element is probably the more important since Magnus has shown that an animal recently fed shows very much better intestinal contractions than one that has been fasted.

In all the experiments the movements of the gut which are carried out in close proximity to the site of injury are invariably smaller than those made by the intestine 10 or 20 times more distant.

The interval elapsing between the time of operation of anastomosis and the graphic recording of the movements does not modify the strength of the contractions. Thus, in experiments which have been carried out in a dog killed one hour after anastomosis the contractions are no larger than in experiments that have been made four days after a similar operation. A moderate amount of acute inflammation about the suture line does not interfere with the movements of the muscle, either near the suture or at a considerable distance from it thus in one experiment the contractions made by a ring of muscle 5 mm from the suture were quite as well defined as those made 150 mm from the suture line.

Only one experiment was carried out on an intestine after gangrene had been produced. In this particular instance, muscle 60 mm from the suture line contracted well, whereas muscle 5 and 15 mm from the suture line remained absolutely quiescent. This quies-

cence cephalad to the injured area would seem to be a protective mechanism. It has been shown that when gangrene occurs the suture line does not withstand an increase in internal pressure. Normal movements of the intestine are undoubtedly associated with an increase in internal pressure. And if weakness occurs at the line of suture an escape of intestinal contents into the peritoneal cavity will occur. From these experiments then it appears that the inhibition of the intestine cephalad to the suture aids in preventing the escape of intestinal contents into the peritoneal cavity.

The movements which have been recorded are not true peristaltic movements. They represent only the segmenting movements of Cannon. No attempt has been made to record graphically true peristaltic contractions. Careful observation has never shown a peristaltic wave spread across the suture line.

The conclusion that may be drawn from these experiments is that despite the very severe operation the smooth muscle of the intestine retains its viability and its segmenting function. This function is demonstrable within one hour after the completion of the operation and is present four days after operation. In the presence of gangrene and a leaking suture, these segmenting movements are inhibited cephalad to the suture whereas caudad thereto the movements are regular, powerful, and well-defined.

ANATOMICAL AND HISTOLOGICAL OBSERVATIONS ON THE PROCESSES OF REPAIR AND REGENERATION

From a gross and microscopic examination of the thirty two specimens comprising the two series together with an examination of many similar suture operations done in this laboratory and a comparison of these observations with those of Mall Gould and others a fairly comprehensive picture of repair and regeneration in healing intestinal wounds has been obtained.

In the course of an operation that divides and then sutures the coats of an intestine a certain amount of damage is done. The knife that has severed the intestinal coats and the scissors that have trimmed off the redundant mucous membrane have killed many cells and fatally injured many more. Handling the peritoneum has done some damage to its serous cells. The needle while passing through the wall of the gut injures some of the small blood vessels. It may also tear off the bottoms of some of the glands and ruptures of the mucosa and may even carry living epithelial cells along the suture tract deep into the submucosa or muscularis. Finally slight contamination of the tissues in and about the wound is inevitable.

As a result of these injuries when the suture operation is completed the blood that has escaped on the free peritoneal surface and between the approximated infolded serous coats coagulates in a wedge shaped mass that plugs the line of suture throughout its entire extent (Fig. 2 A). There is also a certain amount of coagulated blood in the substance of the intestinal wall and about each suture hole. This coagulated blood is no doubt of importance in preventing leakage due to possible faulty operative technique. That it is not essential in preventing leakage if no technical errors are made would seem probable from the two anastomoses done on the intestine of a dead dog in which no coagulation of blood took place and yet which did not leak when subjected to extremely high pressures.

Depending on the amount of trauma done to the peritoneum and upon the quantity of blood extravasated more or less extensive

fibrinous adhesions occur. These develop very rapidly between the line of suture and the surrounding serous surfaces more particularly that of the omentum.

During the first hour following suture polymorphonuclear leucocytes make their appearance in the region of the wound. They may be seen in and about the engorged blood vessel invading the coagula and collecting about the buried sutures. Exudation of serum has begun by the end of the first hour. It is first noticeable between the muscle bundles of the muscularis.

Degenerative changes in those tissues which are fatally injured by the operative trauma no doubt start at once for it can be seen microscopically along the cut mucosal edges four hours after operation.

Reparative processes also no doubt begin very quickly. The intoldded cut edges of the intestinal wall make a ridge which juts into the lumen of the intestine (Fig. 2). The summit of this is composed of the exposed cut edge of the intestinal coats. Somewhere on the sloping sides of this ridge are the junctions between the living mucosa and the denuded area. This junction is often marked by a sulcus (Fig. 4 A). Within 24 hours fibroblasts can be observed proliferating just beneath the necrotic tissue and fibrin which cover the denuded area. Fibroblasts can also be seen beginning to invade the edges of the blood coagula in other parts of the specimen. In the sulcus at the edges of the ridge the epithelium lining the adjacent intact mucosa starts to proliferate growing in a flattened syncytial layer over the denuded surface. The appearance of this new forming epithelium closely resembles the embryonal form (Fig. 3 B). The cystic downgrowth of newly formed glands into the submucosa has begun by the end of 4 hours. This was described by Mall but he did not observe it until the sixth day.

During the next three days the congestion, the edema and the leucocytosis are on the increase. Grossly the fibrinous adhesions become progressively firmer and when torn away leave a reddened suture line with swollen edges. Inside the lumen the degenerated and dead tissue is separated from the

living and is cast off. The denuded surface of the ridge becomes smoothed over with a thin layer of fibrin beneath which granulations are springing up. From the sulci on either side the epithelium is growing over this smooth surface beneath the fibrin.

In seven to ten days the coagulum disappears and is replaced by new connective tissue. This contracts so that it is difficult to tell, microscopically exactly where the line of approximation is. The time required to cover the exposed surface of the inverted ridge is extremely variable. It depends largely on its surface measurements and elevation. Mall found it almost covered with a new mucosa after 15 days. In one of our cases it was not completely covered after 38 days. The average is about 21 days. The formation of new glands proceeds almost as rapidly as the growth of the new layer of the surface epithelium. The newly formed mucosa is at first thinner than normal and has no muscularis mucosae. After two months have passed however it is completely regenerated and cannot be distinguished from the surrounding undamaged mucosa.

After the seventh day the fibrinous adhesions between the suture line and the surrounding serous surfaces have for the most part, disappeared. Those that remain, become organized so that by the fourteenth day they are dense and fibrous and can only be torn away with great difficulty. As suggested by Prof. W. C. Clarke most of these also disappear gradually as the months pass. The movements that go on constantly within the abdominal cavity by gentle traction probably cause stretching of the connective tissue fibrillae; disappearance of the blood-vessels and gradual atrophy and disappearance of the adhesion band. It is common to find after one month only a single narrow band running from the cicatrix in the gut to the omentum or mesentery.

The realignment of the intestinal wall which is the fourth and final stage of repair according to Mall was not as complete in our cases as he seemed to find it. In none of the specimens examined by us did the infolded ridge disappear entirely. It undoubtedly grows much smaller. The circular muscle

appears to be realigned but we were always able to see connective tissue interrupting the course of the muscle-bundles. Marchand (10) said in this connection. The regeneration of the muscle bundles is not abundant enough to bridge small spaces of a few millimeters—if however muscle wound lies against muscle wound the scar macroscopically would conceal itself in the unbroken line of the fibers. That a certain amount of regeneration of smooth muscle can occur seems certain.

The epithelial lined cysts and tubes with adenomatous growths about them deep in the wall of the gut, which were first observed by Mall, we found in four of our cases ranging from 51 to 144 days after operation. They occur usually about a buried suture and have many polymorphonuclear leucocytes in and about them. Mall believed that they were implanted by the needle at the time of operation. They appear to be of purely pathological interest and to have no surgical significance.

Some remnants of the silk sutures were found in every case. In the older ones there were usually one or more loose ends lying free in the lumen covered with gritty material.

SUMMARY AND CONCLUSIONS

The following conclusions based on the data obtained from the operations on the normal and the gangrenous small intestine of the dog are grouped together for the reason that in both series the experiments were the same and the end results identical.

1. The non-infected suture line in the small intestine in dogs is very resistant to internal hydrostatic pressure. For at one hour after operation and any time thereafter the area of operation is capable of withstanding an hydrostatic pressure of over one pound per square inch without leakage.

2. The clinically infected specimens leaked at minimum pressures.

3. To obtain perfect results a proper technique is essential. For it is seen that in a dog recently killed the intestine when properly sutured, is capable of withstanding a pressure of nearly two pounds per square inch without leakage.

4 Imperfect technique results in a defective suture line. The defects if not too extensive may be sealed by the coagulum which probably prevents leakage.

5 The smooth muscle of the divided and sutured intestine retains its viability and segmenting function to within 5 mm of the line of suture.

6 In an infected case with gangrene around the suture line no segmentation occurred within 15 mm while 60 mm away contractions were powerful and well defined.

7 Repair in sutured intestinal wounds begins at once with the coagulation of the extravasated blood which fills in the space between the two approximated serous surfaces. This union becomes permanent in from 7 to 10 days with the replacement of the coagulum by connective tissue.

8 Repair of the mucosa is first seen after 24 hours beginning with a line of vital epithelial cells extending from the edge of the viable mucosa over the denuded surface of the intolled cut edges of the intestinal coat.

9 The denuded surface may be covered with an immature mucosa as early as the fifteenth day (Wall) but it is usually not completely covered until 23 days after operation.

10 Regeneration of the mucosa is complete after two months.

11 Complete anatomical regeneration of the muscularis does not occur. A realignment of the intolled muscular fibers occurs but it is always interrupted by a thin line of scar tissue.

From the above data we conclude that fluid and food may be given immediately after operation without danger of leakage in the sutured small intestine. If leakage does occur it is due to infection or faulty operative technique.

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THE VALUE OF THE DETERMINATION OF THE CHOLESTEROL CONTENT OF THE BLOOD IN THE DIAGNOSIS OF CHOLELITHIASIS

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SINCE the publication in July 11, 1914¹ of a preliminary report on this subject my researches in cholesterinaemia have been continued in the laboratory of the German Hospital. My results seem of sufficient interest and importance to warrant a further more detailed report of my findings.

Much has been written in recent years on

the etiology and pathogenesis of gall stones. In the light of our newer researches the older theories became almost obsolete for they failed to take into consideration the fact that cholesterol is a substance which not only is constantly present in the circulating blood and all other body fluids (except urine under normal conditions) but that its amount varies considerably under different pathological conditions and under different clinical states.

¹ H. H. J. *The Value of the Determination of the Cholesterol Content of the Blood in the Diagnosis of Cholelithiasis*. *J. Am. Med. Assoc.*, 1914, 6.

The formation of a calculus, whether that take place in the genito-urinary, intestinal or biliary tract, is absolutely a physical process undoubtedly dependent upon an altered chemical state of the medium in which the calculus forms. Over fifty years ago Thudicum originated the theory that gall stones were formed by the precipitation of cholesterol and certain calcium compounds as a result of the bile becoming acid. Since the discovery of bacteria, we ascribe chemical changes to bacterial growth and activity. Infection and inflammation of the gall-bladder certainly play a rôle in the formation of gall stones. Bacterial growth in bile alters the chemical composition of the bile. Inflammation of the gall bladder mucosa results in epithelial desquamation and the formation of nuclei for gall stones. But surely the male gall-bladder is just as susceptible to infection as is the female gall bladder and statistics show that 75 per cent of cases of gall stones are found occurring in females. Gall stones are not dependent for their formation upon a primary infection of the gall bladder for we see many cases of cholelithiasis in which the removed gall-bladders show no evidence of the slightest amount of inflammation. It is just as logical to conclude that the stones are the primary cause of the inflammation.

The most recent, and probably the most generally accepted classification of gall stones is that of Aschoff and Baemelster.¹ They classify them as follows:

1. Pure cholesterol stones.
2. Stratified cholesterol-calcium stones.
3. Cholesterol-pigment — calcium stones, which are most frequently found.
4. Composite stones made up of cholesterol and a mantle of cholesterol and calcium.
5. Bilirubin-calcium stones, which are seldom found in the gall bladder but usually in the bile passages of the liver itself.
6. Calcium-carbonate stones which are very seldom found.

The amount of calcium and bile pigments found in gall-stones is very trifling. From an analysis of many stones — an analysis

which sought merely to determine the amount of cholesterol in relation to the whole stone — it can be safely said that cholesterol composes at least 95 per cent of all stones in which cholesterol is a part of their composition.

All authorities in considering the etiology and incidence of gall stones agree upon the following facts:

1. Most of the cases are found occurring in females.

2. A very close relationship between pregnancy and gall stones. Osler in his *Principles and Practice of Medicine* states that 90 per cent of women who have gall stones have borne children and Mayo states that 90 per cent of women who have gall-stones and have borne children identify the beginning of the symptoms of cholelithiasis with some particular pregnancy. The relation of gall stones to pregnancy was formerly ascribed to the excessive metabolic burdens assumed by the liver during the course of pregnancy burdens which the liver failed to carry on. It seems very unreasonable to believe that the body in general and the liver in particular would fail to assume the extra burdens imposed by so normal and physiologic a process as pregnancy.

3. A relationship between typhoid fever and cholelithiasis. It is needless at this time to elaborate on this subject. Cases of gall stones following typhoid fever and cases of gall stones in those who have had typhoid fever are far too numerous to allow of the assumption of a mere coincident relationship.

The past few years have largely increased our knowledge of cholesterol. The presence of a rather definite amount of cholesterol in the blood under normal conditions has been definitely established. The study of cholesterinaemia under pathological conditions has proved the existence of a hyper and a hypocholesterinaemia, and our researches have been sufficiently extensive to permit us to conclude in what diseases, and under what clinical states, we can expect a hyper or a hypocholesterinaemia.

One of the characteristics of pregnancy is a progressive increase in the amount of chole-

terol in the blood. At term a definite hypercholesterinaemia is found and it persists for some time after the birth of the child.

In typhoid fever as soon as a convalescence sets in we note a decided rise above the normal in the cholesterol content of the blood. This hypercholesterinaemia also persists for some time. We have therefore a hypercholesterinaemia in the two most important etiological factors in the genesis of gall stones, in the genesis of calculi which are largely if not entirely composed of cholesterol.

In interpreting the cholesterinaemia in an individual case it is of first importance to know the clinical states and diseases which are accompanied by a rise or fall of the cholesterol in the blood. Pregnancy and typhoid fever have already been referred to.

The influence of fever is marked and always reduces the amount of cholesterol found in the blood. The higher the fever the more marked this influence is.

Progressive arteriosclerosis is accompanied by a moderate hypercholesterinaemia. It is during the stage of the disease before the vessel walls become calcified that this hypercholesterinaemia is noticed. In the old arteriosclerotics in the type who go on to apoplexies the increase in the cholesterol of the blood is not so marked. In fact our researches show that there is actually a reduction probably due to the deposit of cholesterol in the vessel wall.

In chronic nephritis a hypercholesterinaemia is found except when the disease has gone on to uraemia when there is a decided fall. For details I refer the reader to a recent paper¹ on the subject.

Jaundice is always accompanied by an increase of cholesterol in the blood. This is especially true in all cases of obstructive jaundice.

Additional researches in cases of obesity and diabetes will probably show an accompanying hypercholesterinaemia in these conditions.

The normal cholesterinaemia has been placed between 0.0010 and 0.00180 grams per 1 ccm. serum.

¹ Henes J. *Ueber die Abweichungen des Cholesteringehalts des menschlichen Blutes bei verschiedenen Krankheiten.* N. Y. St. J. Med. v. 3, August.

Before proceeding with the presentation of cases I wish to assert very emphatically that despite all that has been said and written for and against this and that method for the quantitative determination of cholesterol in the blood I continue to find the method outlined in detail in one of my first papers² the best and most serviceable.

The following cases are presented to show that a hypercholesterinaemia accompanies cholelithiasis and that a quantitative determination of the cholesterol of the blood when properly interpreted can be and is of great diagnostic importance and value. The cases are presented as briefly as possible and all irrelevant data has been omitted.

CASE 1. Male age 38 years admitted to the hospital with the diagnosis of cholelithiasis. No fever no jaundice no sclerosis. Besides the rather typical symptoms of gall stones the patient showed signs and symptoms strongly suggestive of duodenal ulcer. The stomach analysis was negative. Here was a case in which it was very difficult to make a definite pre-operative diagnosis, and on in whom nothing was found that could influence the cholesterinaemia. The examination of the blood showed the serum to contain 0.00106 gr. of cholesterol to 1 ccm. of serum — an amount far in excess of the normal. Operation revealed the interesting condition of a duodenal ulcer and an inflamed gall bladder with stones.

CASE 2. Male age 58. Temperature 101 F. slight icterus moderate sclerosis no evidence of nephritis. Patient has had attacks of colic and jaundice at intervals. On admission to the hospital the symptoms were referable to the gall bladder. Wassermann reaction negative. Here we have a case in whom there exists clinical conditions which conflict as far as their influence on cholesterinaemia is concerned. The fever tends to reduce while the slight jaundice and sclerosis tend to increase the cholesterol content of the blood. Blood examination showed 0.00187 gr. cholesterol per 1 ccm. serum an amount difficult to interpret under the circumstances. Operation revealed a cholecystitis with gall stones.

The influence of fever on the cholesterol content of the blood is a very definite one and always reduces it. One must constantly bear this in mind in determining the cholesterinaemia in the making of a diagnosis. The following two cases clearly show the influence of fever.

² Ueber die Bestimmung des Cholesteringehalts des menschlichen Blutes bei verschiedenen Krankheiten. Deutsch. Arch. f. klin. Med. 19, 3, 104.

CASE 3. Female, 47 years. Urine negative for nephritis, no jaundice, no scleroses. Temperature of F in past four days had slowly come down from 3 F. White blood-cells, 3,000 polymorphs, 84 per cent. Symptoms referable to gall-bladder and a diagnosis of empyema of gall was made. Blood showed 0.0031 gr cholesterol per 1 ccm. serum, a practically normal amount. Operation revealed an empyema of the gall-bladder and gall-stones. Eight days after the cholecystectomy, during which time 900 ccm. bile had been drained (entailing an absolute loss of cholesterol to the body), with the temperature at 100 F the blood showed 0.00247 gr of cholesterol per 1 ccm. serum.

CASE 4. Female, age 41 years. Urine negative, no scleroses, no jaundice. Two weeks after a ventral suspension for uterine prolapse, the patient began to complain of severe epigastric pain, and showed signs and symptoms referable to the gall-bladder. Temperature 102.6° F. White blood-cells, 22,400 polymorphs, 85 per cent. Diagnosis acute cholecystitis. Patient gave no history of typhoid fever nor did she give any evidence of having it at the time. The blood showed 0.008 gr cholesterol per 1 ccm. serum. Operation showed an acute suppurative cholecystitis with gall-stones. A few days later a positive Widal reaction was obtained and a culture taken from the gall-bladder at the time of operation showed bacillus typhosus. A week after the cholecystectomy with the temperature 100 F the blood showed 0.00353 gr cholesterol per 1 ccm. serum.

CASE 5. Female, age 36 years, admitted to the hospital with a diagnosis of acute appendicitis. Temperature 100° F. Urine showed heavy trace of albumin, and much pus occasioned by a purulent vaginal discharge. Subsequent urine showed no evidence of nephritis. No jaundice, no scleroses. The acute abdominal symptoms were referable to the right hypochondrium and kidney region, and while under observation, symptoms suggested those of duodenal ulcer and gall-stones. The blood showed 0.00143 gr of cholesterol per 1 ccm. serum, an amount just about normal. Ten days after admission the patient was operated upon and a definite pre-operative diagnosis of cholelithiasis was made. Operation revealed an absolutely normal stomach, duodenum, and gall-bladder and a diseased appendix, which was removed. Here in my opinion, we had, or rather the surgeons had, an opportunity to make a definite and correct pre-operative diagnosis, in a case which was rather puzzling.

The following case was especially interesting to me for it chanced to put my ideas on the subject of cholesterinaemia and cholelithiasis to a severe test.

CASE 6. The patient a physician, about 36 years old, was referred to me by a colleague, an eminent surgeon in New York. At the time the blood was taken for examination the patient had no

fever, urine was negative for nephritis, vessels showed no scleroses, and he was very slightly jaundiced. The blood and urine did show a trace of bile. Clinically we were dealing with a case of cholelithiasis, with a history of four years. Four days later the patient developed pronounced jaundice which came on rapidly and the X-ray report, thickened gall bladder with shadow suspicious of gall-stones greatly strengthened the surgeon's faith in his diagnosis. The examination of the blood showed 0.09 gr cholesterol per ccm serum. Under the circumstances, amount certainly not in favor of gall-stones. About month later the patient was brought to the hospital, his jaundice had markedly diminished (and he gave no history of having passed a stone) and an operation performed. The gall bladder as perfectly normal, and a small lymph node removed showed inflammatory changes. We all came to the conclusion that we had been dealing with a case of catarrhal jaundice. A proper interpretation and recognition of the value of the cholesterol determination would have availed an operation in this case.

In presenting these cases I have selected from a series of more than 100 cases those which show not only that a hypercholesterinaemia accompanies gall-stones but that a correct pre-operative diagnosis can be made in those difficult right-sided abdominal conditions which so frequently simulate one or the other of the following conditions: appendicitis, cholelithiasis, duodenal ulcer and peritoneal adhesions. My series of cases show that a cholesterol determination and a proper interpretation of the amount found is almost invariably of distinct value not only in diagnosis, but in the therapeutic indication.

CASE 7. Male, 40 years. Temperature 99.8° F. Urine negative, no scleroses, no jaundice, symptoms referable to stomach, gall-bladder, right kidney and appendix, case in which cholesterol determination could be of value. Blood showed 0.001 gr cholesterol per ccm. serum and under the circumstances a diagnosis of chronic appendicitis was made. Operation revealed normal gall-bladder, stomach, and duodenum, and a chronically inflamed appendix.

CASE 8. Male, age 35 years. Temperature 100° F. Urine showed no evidence of nephritis, no scleroses, no jaundice. Stomach analysis negative. Symptoms were definitely related to the gall-bladder sufficiently characteristic to warrant a pre-operative diagnosis of cholelithiasis. Cholesterol determination showed 0.016 gr per 1 ccm serum, an amount opposed to the diagnosis made. Operation revealed a normal gall-bladder with thick, but no stones, and a chronically inflamed appendix.

In justice to my contention and in furtherance of the interest of the cases presented I wish to add that the pathological diagnoses in individual cases have been taken from the report of the Pathological Laboratory.

CASE 9. Male age 25 years. Nephritis no fever no jaundice no sclerosis. Symptoms referable to the gall bladder and duodenal ulcer. One of gall tones or duodenal ulcer. The X-ray report was one of duodenal ulcer. The blood examination showed 0.00163 gr of cholesterol per 1 ccm serum, an amount not in favor of gall stones. Operation revealed a perforated duodenal ulcer.

CASE 10. The following case is one in which I have no operation to present. It is never theless an instructive one. Male age 1 years. Temperature 101.4 F. Urine negative. Light sclerosis. White blood cells 12,000 polymorphonuclears 94 per cent. No jaundice no admission at which time a diagnosis of appendicitis with reservation was made. The symptom were all referable to the upper abdomen but without definite local signs other than tenderness over the gall bladder. Blood examination at this time showed 0.00234 gr cholesterol per 1 ccm serum, an amount which in the presence of 101.4 F is decidedly above normal and under the circumstances strongly in favor of gall stones. The day after admission without any new symptoms jaundice developed. A few days later the temperature reached normal the jaundice had disappeared and all symptoms had vanished with the result that the patient insisted on being discharged from the hospital. In my opinion we were without doubt dealing here with a case of cholelithiasis.

CASE 11. Here is another case which did not come to operation. I present it because of the decided hypercholesterinemia found. Male age 40 years. No fever no nephritis no jaundice no sclerosis. Symptoms were referable to the right hypochondrium and were strongly suggestive of ulcer of the stomach or duodenum. The blood serum showed 0.00304 gr cholesterol per 1 ccm. The patient left the hospital refusing operation. This is just the type of case in which the cholesterinemia has been most helpful. A case in which the symptoms suggest either an ulcer or gall-stones, and in which the cholesterinemia is decidedly above normal (no other clinical cause being found that could account for the hypercholesterinemia). Such a case is usually one of cholelithiasis, and my experience forces me to maintain that opinion despite roentgen ray findings.

CASE 12. Female age 46 years. Temperature 101.4 F. White blood-cells 12,000 polymorphonuclears 81 per cent. No jaundice no sclerosis no nephritis stomach analysis negative. Symptoms referable to stomach and gall bladder. The blood showed 0.00392 gr cholesterol per 1 ccm serum. This case also refused operation, but a

diagnosis of cholelithiasis is the only one to make under the circumstances even if the temperature had been normal.

The following case is recorded to show a type in which it is very difficult to properly interpret the cholesterinemia.

CASE 13. Female age 68 years. No fever. Urine showed albumin hyaline and granular casts. No jaundice moderate sclerosis. Symptoms referable to stomach and gall bladder. Gastric analysis negative. The blood serum showed 0.0063 gr cholesterol per 1 ccm. We have here an adult female with the sclerosis one would expect and evidences of a nephritis to conditions which in themselves are accompanied by a hypercholesterinemia. One cannot depend upon the cholesterinemia for a definite diagnosis in case of this sort. Although the case refused operation the X-ray showed a large distinct stone in relation to the duodenum. In the straightforward undoubted cases of cholelithiasis we are perhaps not in need of further aids in diagnosis. In my experience I have not seen a case of gall tones verified by operation without an appreciable hypercholesterinemia.

CASE 14. Female age 43. Temperature 100 F. Urine negative no jaundice no sclerosis. Clinically a case of cholelithiasis. Serum cholesterol 0.00303 gr per 1 ccm. Operation chronic ulcerative cholecystitis with gall stones.

CASE 15. Male age 42 years. No fever no jaundice no sclerosis no nephritis. Diagnosis cholelithiasis. Serum cholesterol showed 0.00380 gr per 1 ccm. Operation chronic catarrhal cholecystitis with gall stones.

CASE 16. Female age 3 years. Temperature 101.4 F. No sclerosis no nephritis no jaundice (Had been jaundiced two months ago). Stomach analysis negative. Diagnosis cholelithiasis. Serum cholesterol 0.00120 gr per 1 ccm. Operation cholecystitis with gall stones.

CASE 17. Female age 40 years. No fever no jaundice no sclerosis no nephritis. Stomach analysis negative large tender tumor mass in relation to lower border of liver. Diagnosis cholelithiasis. Serum cholesterol 0.00120 gr per 1 ccm. Operation Chronic suppurative cholecystitis with gall stones.

My researches along these lines have convinced me that a cholesterol determination when properly interpreted is of real value in the diagnosis of those obscure conditions whose symptoms focus attention to the right side of the abdomen. Modern X-ray technique has materially helped us in clearing up these same difficult cases and especially does that apply to lesions within the stomach and duodenum. Roentgenologists must admit

that they have, as yet, failed to reach a sense of security in the X-ray diagnosis of gall-stones. In the following cases in which I mention the X-ray findings, I do so merely to emphasize the importance and value of serum cholesterol determinations.

CASE 18. Female, age 50 years. No fever no nephritis, no jaundice never pregnant, never had typhoid fever. Symptoms are abdominal pains closely simulating those of gall-stones. White blood-cells, 9400 polymorphonuclears, 68 per cent. Stomach analysis negative except for low acidity, no sclerosis had never been jaundiced. X-ray report: Shadows suggestive of gall-stones. The serum-cholesterol equaled 0.00209 gr per 1 ccm., an amount not sufficiently high to be in favor of gall-stones. After observing the case for several days a diagnosis of gall-stones was made. Operation revealed a perfectly normal gall-bladder without stones, and some adhesions about liver and spleen.

CASE 19. Male, age 46 years. Temperature 99 to 100 F (the day previous had been 100 F). Moderate jaundice, urine negative. Symptoms referable to right upper quadrant of abdomen, and the case impressed us as a case of gall-stones. Serum cholesterol showed 0.00317 gr per 1 ccm. and the X-ray department reported "Mottled shadows suspicious of gall-stones. Operation revealed gall-stones."

CASE 20. Female, age 46 years. No fever no jaundice, no sclerosis, no nephritis. Symptoms definitely relative to the gall-bladder and she gave a history of repeated attacks of pain and jaundice. The blood examination showed 0.00300 gr cholesterol per 1 ccm. serum and the report from the X-ray department was in substance, no gall-stones. Operation showed a chronic ulcerative cholecystitis with one large pure cholesterol stone, a type of stone which does not show up well on the X-ray plate.

CASE 21. Female, age 26 years. Temperature 100 F. No jaundice, no nephritis, no sclerosis slightly obese. Symptoms were referable to the gall-bladder. The blood showed 0.0031 gr cholesterol per 1 ccm. serum, and the X-ray report read "No evidence of gall-stones. Operation revealed an inflamed gall-bladder containing six large cholesterol stones."

CASE 22. Male, age 28 years. No fever no jaundice, no nephritis, no sclerosis. Never had typhoid fever. For the past two years he has had symptoms suggesting duodenal ulcer or gall-stones for a long time had duodenal feeding seven months ago appendectomy without any relief Vomiting has always been the chief symptom. The blood showed 0.00107 gr cholesterol per 1 ccm. serum, and the X-ray department reported shadows suggesting gall-stones. A diagnosis of cholelithiasis was made. The findings at operation were practically negative, except for adhesions between the gall

bladder liver and duodenum gall-stones or ulcer were not to be found.

CASE 23. Female, age 45 years. No fever no jaundice, no nephritis. Symptoms referable to stomach. Despite negative stomach analysis, we were, apparently dealing with a case of gastric ulcer that, at least, was the clinical picture presented. The blood showed 0.0084 gr of cholesterol per 1 ccm. serum, and the X-ray department reported one large gall-stone. A second X-ray picture also showed three large stones. Operation revealed a catarrhal cholecystitis with gall-stones. The gall-bladder contained three large stones and many very small ones. There was no evidence of an ulcer of the stomach.

It will be noted from these latter cases, that the cholesterol determination correctly foretold the condition eventually found at operation a claim which I cannot make for the X-ray.

CASE 24. Female, age 48 years, was admitted to the hospital complaining of pains and swelling of lower extremities and pain in lumbar regions. No fever nephritis, no jaundice (had been jaundiced two years ago) no sclerosis. Wassermann reaction negative white blood-cells 8500 polymorphonuclears, 71 per cent. hemoglobin, 70 per cent. Stomach analysis showed 3.4 free hydrochloric acid, 64 total acid, no lactic acid, and no blood. The physical examination showed the lower border of the liver reaching to a line connecting the anterior superior spine of ilium with the umbilicus. Its surface was smooth. Below the edge in the gall-bladder region was a rounded nodular hard mass, the size of a walnut which can be separated from the liver and is tender. Underneath the liver and more posteriorly in lumbar region, a similar mass can be felt. Virchow glands felt. I present this case in more detail because of its interest. The patient's general appearance suggested malignant disease. A neurological examination further suggested the probability of spinal cord metastases. The X-ray examinations of the spinal column and abdomen were negative. A cholesterol determination showed 0.00356 gr per 1 ccm. serum. Despite this hypercholesterolemia, a diagnosis of carcinoma of liver or colon was made, and an exploratory operation performed. The surgeons were very much surprised to find gall-bladder full of stones. It was the gall-bladder that was the mass originally felt. No evidence of malignant disease was found. Subsequent neurological examination of the patient resulted in the conclusion that the symptoms at first thought to be due to malignant cord metastases were due to a multiple sclerosis.

CASE 25. Female, age 29 years. Married last child 8 months ago. Symptoms referable to gall-bladder began 2 months ago. Never jaundiced and not now. Temperature 100° F. White blood-cells 7800 polymorphonuclears 7 per cent. Neph-

ritis, no sclerosis. Clinically a case of cholelithiasis. Cholesterinaemia 0.0025 gr per 1 ccm serum. Operation revealed a few small stones in the cystic duct.

CASE 26 Female age 35 years. Temperature 98.8° to 100.2° F. No nephritis, no jaundice, no sclerosis. Four pregnancies last one eight months ago. Symptoms referable to right upper and lower quadrants. Stomach analysis negative. Cholesterinaemia 0.0021 gr per 1 ccm serum. Operation revealed a gall bladder containing a few small stones and a bronchially inflamed appendix.

CASE 27 Female age 66 years. Ten pregnancies last 16 years ago. No jaundice. Temperature had been 102° F the day before the blood was examined. Urine showed a trace of albumin, a few granular casts, and the arteries showed moderate sclerosis. The blood pressure was 161 mm. White blood-cells 5,400 polymorphonuclears 86 per cent. Symptoms referable to the right lumbar region. Stomach analysis showed no free hydrochloric acid and a diminished total acidity. Clinically we were dealing with a case of gall stones. With a coincident evidence of nephritis and some sclerosis, a moderate hypercholesterinaemia was to be expected. The blood showed 0.00334 gr cholesterol per 1 ccm an amount which in the presence of the 102° fever the day before must be looked upon as a decided increase above the normal. In this case I have no post-operative findings. The patient left the hospital refusing operation.

In three private cases which came under my observation in whom there was absolutely no doubt as to the diagnosis of gall stones, and in whom there were no coincident conditions that would influence the cholesterinaemia I obtained figures of 0.00200, 0.00320 and 0.00347 gr cholesterol per 1 ccm serum. None of these cases has as yet come to operation.

My series of cases includes many which at operation showed either ulcer of stomach, ulcer of duodenum, intestinal adhesions, chronic appendicitis or carcinoma of pylorus conditions which very frequently are to be differentiated from cholelithiasis. Because I do not consider the facts of interest I shall not present those cases whose cholesterinaemias verified the operative findings when those findings were other than gall stones.

Through the courtesy of Dr. Allen O. Whipple I was permitted to examine the blood of several cases referred by him from the services of Drs. Brewer, Elliot and Longcope of the Presbyterian Hospital.

CASE 28 Female age 37 years. Sixteen pregnancies, no jaundice, no sclerosis, no nephritis. Temperature 101° F. White blood-cells 12,500 polymorphonuclears 80 per cent. Symptoms and physical signs all referable to the gall bladder. Serum-cholesterol amounted to 0.00430 grs. per 1 ccm and would have been even higher with normal temperature. Diagnosis of cholecystitis with gall stones was made and operation verified it. About 18 calcium bilirubin cholesterol stones were found in the gall bladder.

CASE 29 Female age 35 years. Typhoid fever 2 years ago. Present history dates back seven years and began while she was four months pregnant. Has had four attacks in seven years of epigastric pain, nausea, vomiting and jaundice. At present no fever, no nephritis, no sclerosis, but very slight icterus. Serum-cholesterol showed 0.0022 gr per 1 ccm serum. The diagnosis of cholelithiasis was verified at operation and fifteen small mulberry-like cholesterol calcium bilirubin stones found.

CASE 30 Female age 54 years. Pain in epigastrium, nausea, vomiting, chills, fever and jaundice coming on in attacks. First attack sixteen years ago after her first pregnancy. Has been pregnant four times since then. At the time the blood was examined the patient was slightly jaundiced, had no fever, no sclerosis. White blood cells 27,300 polymorphonuclears 90 per cent. Wassermann negative. Urine showed very faint trace of albumin and 2.5 per cent sugar. The blood sugar equals 0.146 per cent. Cholesterinaemia in this case amounted to 0.00276 gr per 1 ccm serum. This patient was not operated on, but during her stay in the hospital several faceted gall stones were passed in the feces.

In reviewing the last case the question immediately arises why was not the amount of cholesterol in the blood even higher for the jaundice and the diabetes are in themselves accompanied by a hypercholesterinaemia. In attempting to answer that question the whole subject of the local deposit of cholesterol must be considered. Gall stones are not the only local deposits of cholesterol. In arterio-sclerosis and atheroma of the aorta it has been repeatedly demonstrated that cholesterol is deposited in the walls of the blood vessel. The yellowish plaques found in the atheromatous aorta are largely composed of cholesterol and these plaques are not the result of an infiltration but rather a deposit. The older the process the greater the deposition and eventually the vessels become impregnated with lime salts. It is only in this stage of arteriosclerosis that we

see our apoplexies. And it is during this stage that the cholesterinaemia is not as marked as during the progressive stage. Can we not conclude that the blood-cholesterol is decreased somewhat, because it is slowly becoming deposited elsewhere?

The chronic nephritics who go on to so-called albuminuric retinitis also show the effect on the amount of cholesterol in the blood of the deposition, or in this case infiltration of the retinal tissue with cholesterol. It has been shown that the retinal plaques are composed largely of cholesterol and it has further been shown that cases of nephritis with retinitis, have less cholesterol in the blood than cases of nephritis without retinitis. Can we not again conclude that this diminution is the result of local deposition or infiltration? This same theory I am applying in cases of cholelithiasis. The constant deposition of cholesterol in the gall bladder in the formation of gall stones must slowly deprive the blood of some of its cholesterol. Perhaps this would explain some of the comparatively low figures we get despite the presence of gall stones. This then would bring up another point in the proper interpretation of the cholesterinaemia in individual cases. In the last case presented the patient gave a history of sixteen years. Had we examined her blood ten years ago the amount of cholesterol in the blood might have been considerably higher than 0.00376 gr per 1 cc. A careful history to determine the onset of the gall bladder trouble is, in my opinion an important element in the interpretation of the cholesterinaemia.

CASE 3 (from the Presbyterian Hospital) Female, age 50 years. Has had five attacks of severe, colicky epigastric pain, radiating to the back, with vomiting and jaundice. Has never had typhoid fever and has been pregnant nine times. No sclerosis, no fever, no nephritis, very slight icterus. Serum cholesterol amounted to only 0.0077 gr per 1 cc. and yet at operation, the gall-bladder was found full of small stones. In this case we did not obtain a careful history.

CASE 32 Male, age 63 years. Temperature 100° F. Moderate sclerosis, slight jaundice. Urine showed heavy trace of albumin, but no casts. Symptoms and physical signs were all referable to the gall-bladder. Here again, the comparatively low figure of 0.0024 gr of cholesterol per 1 cc.

serum was found and the operation revealed gall stones. In this case, also we have no accurate history of the duration of the trouble. In my opinion, we must, in the future, ask ourselves: If this patient has gall-stones, how long has he had them?

CASE 33 (from Presbyterian Hospital) Female, age 43 years. Had been on the Medical Service for two months with pyrexia when present attack began. Pain and tenderness in right upper abdominal quadrant with vomiting. Tender mass in the region of the gall-bladder. No jaundice, no sclerosis, no nephritis. Temperature 100° F. White blood cells, 10,000 polymorphonuclears, 78 per cent. Widal negative. Wassermann negative. Has never had typhoid fever and has not been pregnant. The blood showed 0.0001 gr of cholesterol per cc. serum, an amount which must be looked upon as high in the presence of 100° F fever. Operation revealed 65 gall-stones, with recently formed layers of cholesterol.

CASE 34 (from Presbyterian Hospital) Female, age 36 years. Onset of trouble six years ago while pregnant the twelfth time. Never had typhoid fever. Temperature 100° F. White blood cells, 8,000 polymorphonuclears, 86 per cent. Wassermann negative. No jaundice, no sclerosis, no nephritis. Pains in right upper abdominal quadrant simulating gall stone colic. Serum-cholesterol amounted to 0.0033 gr per 1 cc. serum, an amount in favor of cholelithiasis under the circumstances. On operation, a markedly thickened gall bladder containing several ounces of pus and 30 gall-stones were found.

CASE 35 (from Presbyterian Hospital) Female, age 35 years. Three pregnancies, never had typhoid fever. Temperature 100.4° F. No nephritis, no sclerosis, slight icterus. White blood cells 9,400 polymorphonuclears, 4 per cent. Wassermann negative. Symptoms strongly suggestive of gall stone colic. The blood showed 0.0007 gr cholesterol per 1 cc. serum. At operation, the gall bladder was found large and thick, containing 6 ounces of thick viscid bile and three gall-stones.

CASE 36 (from Presbyterian Hospital) Female, age 38 years. For past six months epigastric pain, vomiting, and for past few days slight icterus. Has been twice pregnant. No sclerosis, no fever, no nephritis. Definite tenderness in right upper abdominal quadrant where a mass can be felt. Blood showed 0.00356 grams of cholesterol per 1 cc. serum. Operation showed the cystic and common ducts distended with soft mushy material and many small stones.

CASE 37 (from Presbyterian Hospital) Female, age 43 years. History of epigastric pain radiating to back and right scapular region, fever, vomiting. In past five years has had several such attacks. Has never had typhoid fever, has never been pregnant. At present, no jaundice, no fever, no nephritis, no sclerosis. Exquisite tenderness over the gall-bladder and a mass is felt. Cholesterinaemia amounted to 0.0038 gr per 1 cc.

serum. Operation revealed a distended gall bladder and a pure cholesterol stone impacted in the cystic duct.

CASE 38 (from Presbyterian Hospital). Female age 50 years. History of pain in right upper quadrant onset sudden six months ago with pain in region of gall bladder. Has had four attacks and intermittent jaundice. Typhoid fever at 14 years. Seven pregnancies. At present no sclerosis no fever no nephritis but jaundice. Cholesterinaemia amounted to 0.0031 gr per 1 cc serum. At operation a very interesting condition was found. No gall bladder was to be found the only suggestion of it was a small narrow strip of tissue where the gall bladder should be. The common duct was dilated to the size of a finger. In the lower part of the duct a single oval gall stone was found. It had a cholesterol nucleus and a cul ure from the center of the stone showed bacillus protea.

These 38 cases presented are sufficient to show that in the great majority of cases a hypercholesterinaemia accompanies cholelithiasis. It is needless to enumerate more instances. They also show that the cholesterinaemia must be studied in relation to the clinical condition of the patient at the time the blood is examined before it can be properly interpreted and made to assist in deriving a correct diagnosis. We must make the necessary allowances for the presence or absence of fever jaundice nephritis progressive arteriosclerosis and must also take into account the duration of the process of deposition in the gall bladder. These cases further show that a classical picture of gall stones can prove to be a duodenal ulcer and a classical picture of duodenal ulcer can prove to be gall stones. It is in just such cases that dependence upon a cholesterol determination when properly interpreted will be of great help in making a correct diagnosis and at times cholesterinaemia has almost shamed the X ray.

A hypercholesterinaemia in the absence of arteriosclerosis jaundice and nephritis does not necessarily mean the presence of gall stones. In my opinion we must realize that we are dealing with what can be likened to a diathesis, a cholesterol diathesis. This diathesis is either distinctly pathological in that it may result in arteriosclerosis local or general or in gall stones or it manifests itself as a protective agency as in the infec-

tious diseases and nephritis. Only a careful metabolic study can clear up the many doubtful aspects of the subject of cholesterinaemia.

The following are cases in which the cholesterinaemia was not indicative of the operative findings.

CASE 39 (from Presbyterian Hospital). Female age 31 year. No fever no jaundice no sclerosis no nephritis. No typhoid fever and has been pregnant six times. Signs and symptoms referable to the appendix. Blood showed 0.0027 gr cholesterol per 1 cc serum but at operation a perfectly normal gall bladder was found. Diagnosis appendicitis.

CASE 40. Male age 53 year. No fever no jaundice no nephritis moderate sclerosis. At first symptoms were referable to the right kidney subsequently attention was attracted to the gall bladder. Cholesterinaemia amounted to 0.00330 gr per 1 cc serum a figure that under the circumstances is suggestive of gall stones. Operation revealed a perfectly normal gall bladder stomach and duodenum. I have no further post-operative record. As for the arteriosclerosis in this case I am not willing to state that it alone was responsible for the hypercholesterinaemia.

CASE 41. Female age 64 years giving symptoms of gall stones. No fever no jaundice no nephritis. Gastro-intestinal tract negative by X ray examination. This patient had marked arteriosclerosis. Cholesterinaemia amounted to 0.00310 gr per 1 cc serum an amount which the sclerosis in this case could account for. The operation revealed intestinal adhesions and a normal gall bladder.

These three cases are the only ones in a series of 128 (including the cases presented in the preliminary report on the subject) in which the cholesterol estimation of the blood did not foretell the actual condition eventually found at operation or the definite diagnosis made on the discharge of the patient from the hospital. And in no case of cholelithiasis verified by operation did the blood fail to show a hypercholesterinaemia. Naturally those cases which showed coincident conditions which influenced the cholesterinaemia are not included in that statement.

We cannot overlook the interest and especially the importance of these facts. They prove that a properly interpreted cholesterol determination is of great help not only in the diagnosis of cholelithiasis but also in the differential diagnosis of those diseases which so often simulate cholelithiasis.

DEPARTMENT OF TECHNIQUE

SURGICAL REPLACEMENT OF THE PROLAPSED KIDNEY¹

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SINCE Hahn's initial effort to save the prolapsed kidney and restore it to its normal place and efficiency there have been devised many surgical procedures with the same conservative object in view. But the evolution of nephropexy from 1881 has been slow and varied. The original plan namely splitting the fatty capsule down to the outer portion of the kidney stitching this capsule to the wound and packing the wound with carbolized gauze, has been variously modified by those who followed Hahn, but all efforts to permanently fix the kidney were equally unsatisfactory.

Senn in 1897 appreciating the failure of preceding methods, instituted a radical change, namely the suspension of the organ by means of a strip of gauze passed around the lower pole. In this way he hoped not only to make fixation more certain but to restore the kidney to its normal position. Deaver and Da Costa modified Senn's method by passing a sling around each pole. Fisher employed two decalcified bone drains and Beyer two rubber drains in the same manner. Chambers in 1901 passed a catgut suture around the lower pole. In some of these procedures the fatty capsule was removed but in none of them was the fibrous capsule utilized directly or indirectly as an extra means of support.

Another important improvement in the technique of fixation was made by Lloyd who reflected the fibrous capsule of the convex border of the kidney so that the denuded surface might be apposed to the abdominal wall for fixation. To maintain the kidney in position until union took place Lloyd and some who followed him passed sutures through the kidney substance and both attached and reflected layers of the fibrous capsule. Others utilized the fibrous layers for support by stitching them in the wound.

Previous to October 15, 1907 I employed the technique then in common use namely exposing the convex border of the kidney and maintaining the organ in position by means of the sutures

passed through the reflected fibrous layers and through tissues in the region of the wound. My results were most discouraging and I became convinced that one of the chief faults in this technique was the failure to maintain the kidney in position long enough for firm union to take place. I reasoned that as the fibrous capsule varied greatly in thickness and strength, it was not dependable and constituted an element of weakness in technique so that when force from above was directed against the kidney after operation such as results from vomiting and deep breathing the sutures might tear through the fibrous layer to which they were attached, and that if we could adopt some method by which the dependence upon this capsule for support could be eliminated the problem of fixation would approach solution. This reasoning led me to pass about each pole sustaining sutures of chromic catgut. Results of this technique showed me there were a sufficient number of unsatisfactory cases to convince me that the technique failed to meet all conditions. These results proved to me that the convex or outer border was too limited a surface for fixation and that even though the kidney became attached its position was not always relatively normal and lateral motion was permitted. As the result of such reasoning I adopted a radical change in preparing the kidney for fixation. I.e. exposing the greater part of the posterior surface and using the fibrous capsule to prevent the fat from wedging its way between the apposing surfaces.

Such is a brief résumé of the important steps in the evolution of the method herein advocated.

In discussing the surgical problem of permanent replacement of the prolapsed kidney the approach to the organ demands our first consideration. The posterior or lumbar route is now generally selected but the technique of approach varies and has not yet been standardized. In the technique of approach which I prefer the initial incision begins over the twelfth rib about five centimeters from the spine a little above and to

¹Read before the Medical Society of the County of New York April 26, 1914.

the inner side of the angle formed by the last rib and the erector spina and extends downward and outward ten or more centimeters to a point near the crest of the ilium immediately above Petit's triangle. The tissues covering the erector spinae and the latissimus dorsi are dissected from these muscles so as to completely expose them to view. The next incision is made along the line of attachment of the terminal fibers of the latissimus dorsi to the erector spina and lumbar fascia and this portion of the latissimus dorsi is freed and transferred to the outer margin of the wound. The lumbar fascia or strictly the transversalis aponeurosis is completely exposed when the lumbar portion of the latissimus dorsi is thus transferred to the outer margin of the wound. The lumbar fascia is now incised at its upper portion or superior triangle immediately below and parallel to the twelfth rib. This incision is extended as necessity demands. The lower area of the transversalis portion of the intra abdominal fascia is thus exposed, where it divides to form the fascial capsule of the kidney and the last dorsal nerve is seen following close to and parallel with the inner margin of incision.

In the upper angle of the lumbar fascial incision the retrorenal or posterior layer of the fascial capsule is seen and incision of its posterior layer exposes the fatty capsule through which the kidney is directly approached by blunt dissection. The fatty capsule is now separated by the finger from its attachment to the kidney, excepting about the poles where the finger is hooked into the remaining tissue of the capsule and one or the other pole directed toward the wound. When the kidney is delivered the remaining attached portion of the fatty capsule is freed and both kidney and ureter examined carefully.

A crescentic incision of the fibrous capsule is now made. This incision begins practically on the convex surface near the upper pole, extends on the posterior surface of the kidney to within about one centimeter of the hilum and continues to the convex surface near the lower pole. Two sustaining sutures of silk worm gut, kangaroo tendon or chromic gut are now passed completely around the kidney, one about the lower and one about the upper pole. They are passed in the following way. The one surrounding the lower pole penetrates first the free portion of the fibrous capsule near its juncture with the kidney and about one half inch from the center of the convex border. In its course around the kidney it penetrates the anterior surface of the fibrous capsule midway but only sufficiently to keep it

in place. It is now passed around the inner or concave border close to the lower limits of the hilum and then through the attached portions of the fibrous capsule remaining on the posterior surface. The suture encircling the upper portion is passed in like manner and the ends of these sutures are clamped to keep them in position until the kidney is replaced. Three or more small catgut sutures penetrate the margin of the freed fibrous capsule. These are used after the kidney is returned to anchor this portion of the capsule to the under surface of the lumbar fascia.

None of the fatty capsule except such as may remain attached to the lumbar muscular area is removed. As a rule all of the fatty capsule is forced below and in front of the kidney when the organ is replaced where it is retained by the anchored fibrous capsule. The inner ends of the sustaining sutures are now passed in the upper angle of the wound through the lumbar muscles penetrating them well to the inner side of the last dorsal nerve and out through the skin. The outer ends are passed through the muscular tissue immediately below the twelfth rib and out through the skin. The several catgut sutures which are attached to the margin of the freed fibrous capsule are now anchored to the under surface of the lumbar fascia near its cut edges. The freed fibrous capsule being thus anchored to the under surface of the fascia acts like a shield to prevent the fat in the immediate region from being forced between the posterior surface of the kidney and the quadratus lumborum.

The fascial or aponeurotic incision is now closed with No. 1 or No. 2 plain catgut sutures care being taken to avoid the last dorsal nerve which can be plainly seen crossing the inner margin of the wound. One or two interrupted catgut sutures may be necessary to approximate the fibers of the transversalis and internal oblique muscles. The latissimus dorsi is now returned to its position and its cut edges sutured to its original line of attachment with a continuous plain catgut suture No. 1 or No. 2. The subcutaneous structures are approximated by one or two interrupted catgut sutures and the skin edges united by any method preferred. The sustaining sutures at the upper angle of the wound are tied over a small roll of iodoform gauze, the lower suture being tied first so as to elevate the kidney as much as possible. If kangaroo tendon or chromic gut be used for the sustaining sutures they can be brought out through the skin or not as desired by the operator.

Post-operative care extends over three weeks. In dressing the wound care should be taken not

to restrict the motion of the chest or abdomen. It is usually not necessary to redress the wound until the seventh day. The skin sutures are removed on or after the twelfth day. The silk worm-gut sutures are cut to the inner side of the loop on the nineteenth day and the patient allowed to get out of bed and sit in a chair. This is more advantageous and comfortable than sitting with the limbs extended in bed as the abdominal contents are less crowded. She is encouraged to walk on the following day and on the twenty first the silkworm-gut sutures are gently pulled upon. If they do not come away easily force is not used. The patient is encouraged to walk about and gentle traction is again made on them in a day or two.

The severing of the terminal fibers of the latissimus dorsi along their attachment to the erector spinae and the lumbar fascia and the transferring of the lumbar portion of this muscle to the outer boundary of the wound permit of a complete exposure and easy access to the upper portion of the lumbar fascia or superior triangle. This temporary removal of the muscle from the direct line of approach to the kidney not only facilitates deep manipulation but affords an opportunity for the selection of the direction of the fascial incision. The latissimus dorsi is usually larger on the right side than on the left, owing to the fact that most people are right handed. When this muscle is not well developed, considerable care must be used in severing its fibers near their lumbar attachment so as not to open the sheath of the erector spinae nor cut the lumbar fascia immediately below. The fibers of this muscle in the lumbar region are usually attached in greater part to the sheath of the erector spinae, but it occasionally happens that its inner one-half or more is attached to the lumbar fascia only thus leaving a considerable part of this fascia uncovered by muscle. When the lumbar fascia is incised in the general direction of the erector spinae, as is commonly done, the nerves and blood-vessels which lie immediately below and which run nearly at right angles to the incision are necessarily subjected to great risk of injury but when the fascia is incised immediately below and parallel to the last rib we approach the deeper structures of the outer side of the last dorsal nerve. This nerve follows closely the lower border of the twelfth rib for a short distance, then changes its direction slightly. Its average distance from the rib in the lumbar fascial region is about one centimeter. The nerve is easily located under the fascia on the inner side of the incision and close to its edge and as

its divergence is in the general direction of the pelvis a continuation of the incision outward into the transversalis and internal oblique muscles can be made to any required extent without fear of injury to it unless there exists an abnormality. If it is desired to enlarge the incision inward the lower border of the rib must be followed closely.

During operation the nerve is practically always within view and easily avoided when passing the silkworm-gut sutures through the muscles and when closing the fascial incision. Exceptions to this course of the nerve may be met with, that is, the nerve may follow closely the twelfth rib its entire length necessitating great care in avoiding it when enlarging the incision and when passing sutures through the outer portion of the wound. I have encountered this abnormality twice. The importance of avoiding the nerve cannot be overestimated, as injury to it is often responsible for painful sequelae. The last dorsal, the iliohypogastric and the ilio-inguinal nerves are encountered in most methods of approach increasing thereby the chances of nerve injury. Post-operative pain and diasthesia along the iliohypogastric nerve in the gluteal region, pain in the outer side of the thigh and hyperesthesia along the course of the iliohypogastric nerve have been frequently observed following the technique of approach through the lumbar fascia at a right angle to the general direction of the nerves of that region and therefore constituting a serious objection to this method of approach. Since adopting the present technique of approach post-operative nerve symptoms have been materially lessened.

The only arteries of any size encountered in this technique are sufficiently small to be controlled by forceps pressure and are encountered usually when in the lower angle of the wound, as the aponeurotic or terminal fibers of the latissimus dorsi are severed and the other in the upper angle of the fascial incision when the incision is extended to involve the lower digitation of the serratus posterior inferior.

On replacing the kidney the posterior portion of the fatty capsule is removed if any of it remains attached to the lumbar muscular area, as its presence there will interfere with the proper apposition and union of the surfaces to be apposed. The remaining portion of the fatty capsule is forced anterior to the kidney and maintained there until the fibrous capsular flap is anchored to the under surface of the lumbar fascia. The fat is in this way prevented from wedging between the kidney and the lumbar area.



Fig. 1. The recter spine and lumbi are shown at the bottom of the wound. The lumbi above the latissimus dorsi are in the second step with the peritoneum severed along their attachment to the erect aponeurotic margin of the wound.



Fig. 2. The initial incision in the lumbar region is shown. The lumbi are in the second step with the peritoneum severed along their attachment to the erect aponeurotic margin of the wound.

to which it is to be fixed. When the denuded posterior surface of the kidney is in this manner apposed to the aponeurotic covering of the quadratus lumborum and union between them takes place there is established a condition of the kidney closely approaching normal namely stability with limited mobility.

By following the technique herein described the possibility of injury to the lat dorsal nerve and its blood vessels is eliminated unless their location is abnormal and even then by careful manipulation serious injury can be avoided. Opening into the peritoneal cavity is impossible excepting when the liver or spleen is prolapsed and mistaken for the kidney. In passing the sustaining sutures about the poles care should be taken to discover and avoid the ureter and the renal vessel. In delivering the kidney from the wound we sometimes encounter an accessory artery passing through the fatty capsule and entering the kidney usually near one of its poles. This is recognized first by the greater resistance it offers as compared to that offered by the fatty capsule alone and also by its pulsation. The artery should be secured by a forceps before further attempt is made to deliver the kidney. With ordinary surgical care the delivery procedure should entail no danger.

It possesses the advantage of permitting a thorough preparation of the kidney and allowing a complete examination of the organ and upper

urinary tract and affords an easy approach through the pelvis to the ureter for the removal of all its complications be discovered.

In replacing the kidney the lower part should as a rule be turned first. If difficulty be met with it is usually due to the intraabdominal fascia offering an additional obstruction at the lower angle of the wound. To facilitate replacement the fascia may be further incised or retracted usually it is only necessary to grasp the cut edges of the fascia with a forceps in the angle and gently force the pole through the fascial incision.

Though the anatomy of the lumbar region is familiar to every surgeon the functions of the structures about the kidney with respect to the support and mobility of the organ are very indeterminate. The kidney is afforded its chief protection from external influences by the pinal column the great back muscles and the lower ribs. Within their boundaries there is a well-defined space in which the kidney rests. The fascia varies in depth with the sex and in different individuals of the same sex. Any influence which restricts the free motion of the upper abdominal and lumbar regions as for instance tight lacing tends to force the kidney out of the fossa and subject it to the depressing influence of force from above. The fascia is therefore an indirect factor in the maintenance of position. The kidney has no ligament strictly speaking but is completely surrounded by a strong fascial structure. The fascial structure of capsule is but a part of

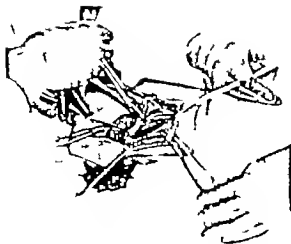


Fig. 3. The fascial incision extended in hanging in the lower angle, the internal oblique and transverse abdominis muscles.

the great intra-abdominal fascial system which is so wonderfully arranged as to render vital support to practically every abdominal organ and out of which most of the so-called ligaments of the abdominal viscera are formed. The renal arteries and veins render no support while the kidney is in normal position. These vessels support the kidney and restrict its mobility only when it is forced beyond its normal range of motion which motion does not exceed in any direction, three centimeters.

The fatty capsule or perirenal fascia is composed of a posterior and anterior layer. Superiorly and outwardly these fascial layers are continuous inferiorly and inwardly they do not blend and can be easily separated by blunt dissection. Inwardly they surround the renal vessels as far as the spine, where the posterior layer terminates and is attached and the anterior layer blends with the corresponding layer of the opposite side. Inferiorly they surround the ureter and their failure to unite in this direction constitutes an essential weakness in the scheme of renal support. The posterior layer also called the retrorenal fascia, is intimately attached to the fibrous arches for the psoas and quadratus lumborum to the twelfth rib in this immediate vicinity the first and second lumbar vertebrae and the diaphragm. As the upper and outer portions of the anterior layer are continuous with the corresponding portions of the posterior layer and the posterior layer is fixed to stable points of the anatomy the stability of the anterior layer is greatly dependent upon the fixity of



Fig. 4. The fatty capsule open kidney seen at the bottom of the wound. (Photograph unsuccessfully retouched.)

the posterior layer constituting a most important factor in renal support.

Between the kidney and the fatty capsule there is a network of areolar tissue in the meshes of which is deposited fat constituting the tunica adiposa. This so-called fatty capsule renders support to the kidney to which it is attached only as it is in turn supported by the fascial capsule to which it is also attached. The fatty capsule renders support to the kidney only within the limits of the fascial capsule that is if the fascial capsule were detached from its fixed points of support the kidney with its capsules would prolapse and be limited in descent or motion by the resistance of the renal vessels alone but if the fascial capsule remains fixed and the tunica adiposa be completely severed from its attachment to the kidney the kidney would then prolapse within the limits of the fascial capsule.

Morris cites that in the infant the fatty capsule does not exist and it is the peritoneum which is the chief agent giving fixity to the kidney. The conclusion to be drawn here is that with or without the fatty capsule the peritoneum is an important factor in supporting the kidney. To my mind the resistance afforded by the peritoneum *per se* and the support it renders the kidney in infant or adult is practically inconsiderable. The peritoneum is attached to the intra-abdominal fascia from which is formed the fatty capsule and its stability is dependent upon the stability of this fascial capsule.

Edebohl remarks that in the early operations of nephropexy the idea dominated that the kidney ought to be anchored as high up as possible

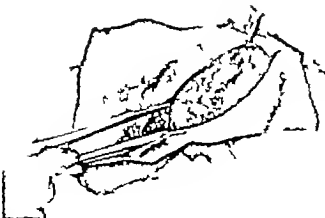


Fig. 5. Thickened retroperitoneal fat capsule which has been forced into the retroperitoneum. (The retroperitoneum is present.)



Fig. 6. A resultant incision of the retroperitoneum. The posterior surface of the kidney is exposed from the pole of the retroperitoneum.

under the ribs. The fact was not sufficiently recognized and appreciated that it is the mobility of the kidney which gives rise to the symptoms and that the latter will be perfectly relieved by anchorage of the lower organ even at some distance from its normal habitat. The attempt to realize the ideal inspired the practice of anchoring more or less of the lower end of the kidney only leaving the untouched pole to project upward beneath the ribs. This lead in many cases to either anteversion of the upper pole or to the crowding down of the kidney and often resulting in the return of the old symptoms. Again he states that the kidney cannot be fixed in its normal position and should be fixed squarely in the loin. The middle part fills the lumbar spaces the upper part projecting as far upward beneath the rib as the lower pole reaches downward below the level of the crest of the ilium.

The practical result of the technique that I follow as well as experimentation upon the cadaver have demonstrated that the kidney can by surgical means be placed in the immediate region of its normal habitat the only exception being when the liver or spleen are also considerably prolapsed and enlarged for by occupying the kidney region they crowd the organ and may prevent it from assuming its normal position. With no obstruction in the upper lumbar region the elevation of the entire organ is ensured by tying the suture encircling the lower pole first. The tying of the upper suture next ensures the position of the upper pole and the mobility of the organ.

When the heath of the quadratus lumborum

is opened its entire extent and the muscular fibrous layer had been advised by Edelbohl it is difficult to prevent injury to the nerves and blood vessels of the region if they are immediately in front of the muscle. Fixation of the kidney to the muscle causes an abnormal relationship and every motion of the muscle imparts motion to the kidney and every force acting on the kidney must act correspondingly on the muscle. The function of the nerves and vessels are likewise frequently interfered with by such intimate and abnormal fixation but union of the kidney to the fascial and aponeurotic structures covering the quadratus lumborum would in no way interfere with functioning of the muscle nerves or blood vessels. The only preparation of the muscle area in the technique which I advocated is the removal of the retrorenal fat if any remain attached to this area.

According to Edelbohl the broader the surface for union the stronger will be the anchorage. He in common with all others aimed to fix the outer or convex surface of the kidney to the anterior plane of the quadratus lumborum. In so doing he made an extensive denudation of the kidney surface but this stripping back of the capsule beyond the limits of the convex surface does not increase the area to be apposed for fixation. In width this surface is usually no more than two and one half centimeters and because of its considerable convexity its middle one-third only can be well apposed to the flat surface of the muscle. The posterior surface of the kidney presents the least convexity and greatest expanse for apposition and if the question of permanent anchorage resolves itself into the question of the extent of the surfaces apposed there is left no room for argument as to which surface of the kidney is the surface of choice.

Another objection to fixing the kidney by its

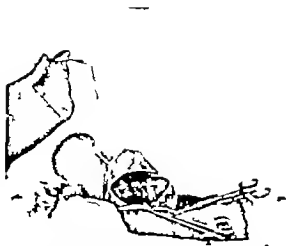


Fig. 7. Three V. O. chromic catgut sutures penetrate the margin of the freed portion of the fibrous capsule. After the kidney is replaced these sutures are used to anchor this fibrous flap to the under surface of the lumbar fascia, where it acts as a shield to prevent the fat from entering between the kidney and the quadratus lumborum.

convex surface is that when so fixed the hilum is forced forward and out of its normal and anatomical relationship. However, when the posterior surface, which is slightly convex, is apposed to the concavity of the lumbar region, the hilum is directed inward and its anatomical relationship restored. Resting thus on its posterior surface the kidney occupies less space anteroposteriorly than when fixed by its outer surface, and assuming thus a protected position in the lumbar fossa according to Nature's plan, escapes force from above as when a coin placed in the palm of the hand escapes the influence of a brush passed over it.

The principles of nephropexy advocated by Billington are open to several objections. The suspension is made in part through a flap of the fibrous capsule stripped from the upper half of the convex and posterior surface. Additional support is rendered by two Brodel sustaining sutures inserted in the attached fibrous capsule covering the lower one half of the convex surface. The fibrous flap, the base of which is attached to and crosses the center of the convex surface is passed up and out between the eleventh and the twelfth ribs and attached to the lips of the fascial incision. The Brodel sutures are tied first being inserted in the attached portion of the fibrous capsule on the lower half of the convex surface direct and fix this area to the posterior wall. The position occupied by the kidney when

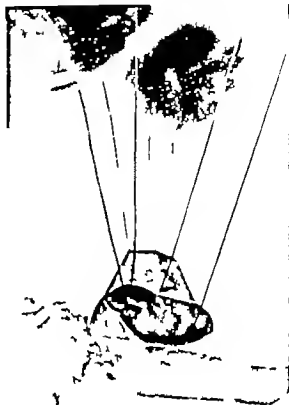


Fig. 8. The three catgut sutures with chromic catgut sutures are here shown anchoring the kidney, also the three fibrous capsule turn.

so suspended is on a line external to the outer margin of the rectus spina and the middle of the convex border is on a level with the twelfth rib while the hilum is directed forward. This position of the kidney is not normal and the organ becomes to a dangerous degree exposed to force from above. In Billington's technique no provision is made to support or even limit the motion of the upper pole so that this pole is free to move in whatever direction influenced. Under these circumstances a displacement of the upper pole is always possible when vomiting or coughing are severe and persistent. The organ is therefore liable to topple over or antevert and produce a twisting of its pedicle. Also when the liver is enlarged or is prolapsed much below the twelfth rib it is practically impossible to adopt Billington's technique.

The technique advocated by Longyear fails also to ensure the normal replacement of the kidney and as the position of its upper pole is not

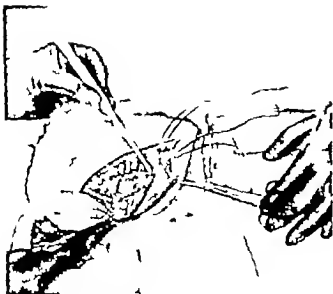


Fig. 4. The lower abdominal wall is closed. The skin and muscle sutures have penetrated the muscles and skin and are seen emerging near the upper angle of the skin incision. The retrocolic but unsutured kidney.

ensured the kidney may likewise antevert and produce a twisting of its pedicle. Longueur's technique possesses one possible advantage and that only when the anterior layer of the fascial capsule has been considerably stretched by the prolapsed kidney his technique fixes the cellular structure termed by him a renocolic ligament which connects the lower anterior surface of the kidney with the anterior layer of the fascial capsule. To which on its peritoneal side is usually attached the colon and in so doing may elevate to some extent the colon. But the cellular structure of the fatty capsule is a structure of little resistance and the permanency of the apposition may be considered doubtful if it is dependent upon this structure. The area of the anterior layer of the fascial capsule to which the colon is attached is located near the spine and as this layer of fascial capsule blends with the corresponding layer of the opposite side and is attached to the tissues of the spine it is rendered more stable than the middle portion. In prolapse of the kidney it is usually the middle portion of the anterior fascial layer which yields. Cases are not uncommon however where the prolapsed organ follows the line of fascial cleavage in the direction of the ureter where the failure of the layers to fuse constitutes a weakness in Nature's scheme of kidney support.

When the kidney is fixed by the technique which I advocate the constant pressure on the anterior layer of the fascial capsule is relieved. The released fatty capsule placed anteriorly must



Fig. 5. The kidney undischarged and the silk worm gut sustaining suture tied over a roll of iodoform gauze.

again attach itself somewhere and can attach itself nowhere but to the stable kidney. The overstretched fascial capsule relieved of the weight of the kidney returns to its normal condition and position. If however it is considered necessary or desirable to fix the lower cellular tissues which are indirectly connected to the colon it can be accomplished during the operation by passing one or more sutures through it and anchoring them to the lumbar fascia when closing the fascial incision.

SUTURE MATERIAL

I prefer the use of the silk worm gut as a sustaining suture to chromic gut or kangaroo tendon because the power is constant while that of the absorbable diminishes in strength daily. With the use of the silk worm gut the maintenance of the kidney where placed is ensured until sufficient time has elapsed for strong union of the surfaces apposed. With the use of the absorbable materials there is no certainty of this apposition remaining when force is exerted from above such as may be caused by deep breathing, persistent coughing or vomiting.

The objection has been made to silk worm gut that it is likely to cut the kidney surface. This objection is only theoretical as in my experience such has never occurred. The sustaining sutures do not touch the kidney proper it being protected by the attached portion of the fibrous capsule on its entire surface. It is necessary that the silk worm gut sutures be carefully selected and that they be of large size and smooth as points of

roughness make their removal difficult. Such an experience I have met with twice in each instance great care and patience had to be exerted. In one of these cases more than a week of gentle traction daily was required and on removal of the gut it was discovered that extensive corrosion at several points had taken place. The black dyed is not desirable as it is friable. Plain or vegetable dyed is to be preferred.

The arguments advanced in favor of silkworm gut apply equally to silver wire the latter possesses the additional advantage, however of never becoming rough. The chief objections to its use are that it is not always conveniently obtained and that if the loop has in it a kink, the removal of the suture may be difficult and painful.

The absorbable sutures are less objectionable as sustaining sutures if they are brought out of the body and tied over a roll of iodoform gauze as is done with the non-absorbable. By this technique the burying of the knot in the tissue is avoided. Nature is usually capable of contending with these knots but she sometimes fails.

DRAINAGE

Drainage is never necessary excepting perhaps where a stone is removed at the time of nephropexy. If a stone be removed from an incision in the pelvis of the ureter the direction of the drain should be from the area between the pelvis of the ureter and the muscles of the back along the lower pole and through the lower angle of the lumbar fascial incision. It should then penetrate the fibers of the latissimus dorsi immediately above and pass out through the corresponding opening in the skin. If the stone be removed through an incision in the cortex, the drain is

Friable silkworm gut has been tried, but without satisfaction, as the tissues become entangled in its fibers and render its removal difficult.

in the same direction as described, but leads from the convex border only. When the cortex is cut in removing a stone, the sutures encircling the kidney assist materially in apposing the cut surfaces and in checking hemorrhage.

In both pyelotomy and nephrotomy nephropexy should at the same time be done. This can be best accomplished by the technique here advocated because in so doing the kidney is suspended at its greatest possible elevation and consequently thorough drainage is ensured to the distended pelvis or pus cavities.

SUMMARY

1. This approach to the kidney necessitates the least injury to the tissues encountered and facilitates deep manipulation.

2. In closing the wound only a minimum amount of the simplest suture material is required and the replacement of the tissues is absolutely anatomical.

3. The kidney area exposed for attachment is the most extensive surface available and so situated as to permit the kidney being anchored in normal anatomical relationship.

4. The sustaining sutures encircling both poles ensure immobility until firm union has taken place and their high placement in the tissues of the back ensures a practically normal position of the organ.

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A METHOD FOR PREVENTING AND CONTROLLING HEMORRHAGE FOLLOWING PROSTATECTOMY

By I. H. COOK, M.D., BUFFET, INDIANA

PROSTATECTOMY may not be followed by severe hæmorrhage; bleeding may be slight or severe and readily controlled by one of the various procedures ordinarily applied. But in some instances it may be alarming especially in the aged when the loss of blood and the accompanying shock greatly lessen the chances for recovery. In addition to the means that have been suggested and already applied the following device seems to me to possess advantages that would be of value when hæmorrhage becomes severe or difficult to control.

A catheter of good size is passed into the bladder and drawn out through the opening at the fundus a strip of gauze about one and one half inches in width and of sufficient length as may be required to make a pack approximating the size of space to be packed is wrapped around and above the opening of the catheter by two or three stitches coming out at the side of the catheter over the gauze and tied the first knot being drawn down snugly to the gauze. Before tying the second knot a thread of sufficient length to be drawn out of the bladder wound along with the end of gauze strip is placed over the first knot when the second knot is tied. The thread

making the tie is then cut close to the knot. Two or three such threads are placed each long thread and strip of gauze is held when the catheter with the ring of gauze pack is drawn into the bladder down to the bleeding area sufficient traction being made to secure coaptation of the denuded surfaces thus obliterating the space occupied by the prostate. When the danger from hæmorrhage has subsided traction is made upon each thread thereby releasing the second knot. Traction upon the protruding end of the gauze releases the first knot and unwinds it from the catheter permitting its easy withdrawal from the bladder. The drainage or irrigating tube is placed to be removed when desired.

The gauze pack applied in the manner described not only serves in controlling and preventing dangerous hæmorrhage but also serves to replace the torn and overlapping bladder wall holding the denuded surfaces in place and to early union of the parts separated by the operation rendering unnecessary the frequent hot water irrigation used by some operators a means of controlling hæmorrhage that is not only painful to the patient but adds to shock from frequent disturbance.

A PAINT BRUSH DRAINAGE TUBE

By A. MERRILL MILLER, M.D., F.A.C.S., DANVILLE, ILLINOIS

FOR some time past the split rubber tube has found favor for use in cases requiring drainage.

The objection to its use in the abdominal cavity is the danger of necrosis of soft tissues by the hard unyielding end. To overcome this objection and retain the advantage of the tube I use a tube splitting the entire circumference an inch or more in its long axis. The small rubber



terminals thus made will not cause pressure necrosis and will readily adapt themselves to changing positions of the abdominal viscera (see illustration).

BOOK REVIEWS

A CRITIQUE OF NEW BOOKS IN SURGERY

B. MAJOR G. SEELIG, M.D., S. LUTZ

THERE is something subtly deadening in reading with the fixed purpose of criticising—something that is not categorically different from the state of mind of the modiste as she surveys the new spring styles. If one cannot successfully lose the thought that he is a critic, he finds himself inevitably snared in a maze of data, which though foisted down purely for purposes of criticism, confuses his sense of appreciation and clear reasoning. This is particularly true of medical books. Medical theory and practice is in a state of constant flux; there is so very little that may be expressed in warrantably *ex cathedra* fashion, and by contrast so very much that is promulgated with the seal of authority affixed that one subconsciously finds himself holding his mind open to mere details worthy or unworthy upon which to rest his criticism.

On the other hand, if one reads for the simple joy of reading unimpaired of opinions that may be crystallizing in his own mind as he reads, he finds that each volume makes a totality of appeal to his judgment. He sees and feels what he otherwise would have failed to see and feel. Good reading, like good painting, should be done with the thought of perspective and proportion always in mind.

There is a central idea of purpose in practically every volume published. The art of the critic lies in furnishing sane comment on this purpose, or in pointing out the failure or success of the author in making his purpose clear. Of course in doing this, details must neither be elided nor lost sight of; the reviewer should bear in mind merely that if he dissociates himself from the large purpose of the book, and centers his critical attention unduly on details, he will too often find himself not seeing the forest for the trees.

Let us go through the books of the month with the notion in mind of the impelling motive that is responsible for each volume. Whatever there may be said regarding the value of this type of critique no one may say that it is lacking in interest.

THIS volume on *Autoplastic Bone Surgery* illustrates most admirably exactly what we mean by the phrase central idea of purpose. One does not need the statement in the preface of the book to convince him that the authors have had their interest awakened from three different

Autoplastic Bone Surgery. By Charles Dwyer, M.D. and Franklin D. Smith, M.D. Philadelphia and New York: Lea and Febiger, 1926.

directions: experimental bibliography and clinical. There are no concrete statements in the text emphasizing the fact but one knows nevertheless, that the authors felt the inner drive to aid in clarifying a surgical topic that is just now in process of evolution. Such purpose is worthy, and it is gratifying to be able to note that accomplishment has kept pace fairly well with purpose.

The book does not differ markedly from its sister volume written almost synchronously by Albee and recently reviewed in these columns. A careful survey shows that in spite of a different arrangement of chapter heads, the same subjects are treated in much the same fashion with the normal diversity of opinions that one would expect to meet in most subjects of this type. The general topics of bone transplantation, periosteal regeneration, indications and technique, autoplastic repair of fractures, rhytidoplasty, autoplastic immobilization of spondylitis and of congenital bone defects are all accorded due space. The chapters on periosteal regeneration of bone and regeneration of bone are written with almost didactic clearness, each chapter ending with a clear, crisp summary of the fundamental facts.

It is interesting to note that the indications for bone grafting furnished by Davidson and Smith tally almost with letter with the indications set by Albee. One is also struck by the fact that these authors have seen the wisdom of doing what Albee failed to do, namely, appending what seems to be a very full and accurate bibliography.

Anyone who has followed this new chapter of bone surgery closely, mindful of the great diversity of opinion so discernible since the publication of McCraw's book, *Growth of Bone*, will naturally hesitate to take sides with or against the authors on any doubtful question. The thing of significance and interest is that the purpose back of the book has resulted in furnishing us with work of practical importance from the academic as well as from the purely technical point of view. We have said before in these pages, that the good monograph is the lodestone of the library. This volume serves to strengthen that opinion.

THIS next book by Dr. Crile has in some inexplicable way reached the reviewer's sanctum about one year late. The delay is in a

Voice Association. By George B. Crile, M.D. and William E. Lower, M.D. Philadelphia and London: W. B. Saunders Company.

sense fortunate for had the book reached us on schedule time we would have felt obliged to paraphrase the doctrine of anoci-association comment on its scientific basis dilate upon the weakness and strength of Crile's methods. In short fuse the new doctrine in the crucible of criticism. Now for unluckily all this has been done for us. It is pretty safe to assume that those who do not feel what William James used to call the sense of personal warmth of knowledge of the anoci-association theory do not read ST. CLARE GAYNE HUGHES ON STRENGTH. We are free therefore to play with the thesis of the month and content ourselves solely with interpreting the purpose back of Crile's work.

And lest our judgment appear colorless and ultra-judicious it is necessary to say at the outset that we feel that the recent severe criticism of anoci-association by Carlson even though it took on somewhat the form of a polemic, was in good part justified. This is unfortunate and equally unfortunate is the fact that many of Crile's conclusions do not flow from well-constructed syllogisms but seem to be revelational.

If one dismisses for the time being all such broad generalizations as the above he unavoidably centers on the drive back of the work the enthusiastic, determined effort to popularize a doctrine. And however much one may take issue with the so-called pure science of the work or how ever spiritedly he may cavil at the all too comprehensiveness of Crile's inclusions he must nevertheless feel the weight of sincere effort represented by the large amount of experimental data collected over a long period of time.

The presentation of this mass of experimental data marks only one half of the purpose of the book—it stands as the academic purpose. Much more important are the advantages that have accrued to surgery. These latter results constitute the practical workaday purpose of the doctrine. Beyond all question of doubt Crile has ingrained a spirit of surgical gentleness in the consciousness of countless surgeons. Careful selection of operative material gentleness of manner deliberate and thoughtful precision of a closely related fusion of individual efforts—these are things that have resulted directly from Crile's magnetic rays written and spoken, and I for one am content to let such things tip the balance against the load of somewhat faulty logic. In other words I am inclined to pass over the conflict of testimony and to experience a deep sense of gratitude for what the doctrine of anoci-association has done for surgery from the crass practical point of view.

In this volume Smithies has collected the largest amount of clinical data offering the greatest number of intensively studied stomach cancers

that I have ever seen grouped between two covers. In reality the book comes under the head of monographs but bulk form thoroughness and wealth of illustrations force one to group it under the head of treatises.

The plan of the book excellent throughout rests on a carefully developed chapter division of twelve parts. Each chapter in its turn is based upon the personal experience of the author and then rounded out by a critical selection from literature of data bearing on the various important topics discussed. It is impossible to overestimate the value of this method of exposition. For example in Chapter XIII on Gastric Cancer in the Young Smithies not only analyzes in minute detail eighteen such cases of carcinoma studied by him but also furnishes his reader with the references necessary for a broad conception of this most interesting though limited topic. Welch Osler McCrave and Dock.

Chapter I General Distribution and Etiology furnishes nothing new but it well presents in rather extended fashion much valuable data collected from various credited sources. Chapter II on Morbid Anatomy is notable chiefly for the large amount of pathological material, and the care with which it has been studied. Excellent and painstaking as has been the work of MacCarthy it hardly justifies Smithies' statement that to it we we practically all our useful knowledge regarding the early histologic changes which are associated with the development of gastric cancer. The notable point in Chapter III Symptomatology is the radical and yet rational (though we must concede Utopian) hope expressed by the author that the early diagnosis of cancer of the stomach must be made microscopically from a bit of freshly removed tissue. This chapter is particularly full embracing as it does quite a number of illustrative case histories. Chapter IV deals with physical signs under the questionable title of Physical Abnormalities. In this chapter Smithies very wisely dilates upon those signs (he enumerates seven of them) which determine the inoperability of gastric malignant neoplasms. Chapters V VI and VII deal in order with the clinical microscopy of gastrointestinal function roentgen examination and blood changes in gastric carcinoma. That portion devoted to roentgen examination is only fairly well illustrated the plates are by no means as good as the recently published ones in the work of George and Leonard. It is necessary to emphasize this fact because a poor reproduction of an X-ray plate is worse than useless. Chapter VIII the Significance of Gastric Ulcer with Respect to Gastric Cancer suffers somewhat by reason of its highly statistical character. We should have preferred a more condensed and concentrated arrangement of the statistics followed by a more distinctly personal statement by the author of his own interpretation of the figures. Chapter X Differential Diagnosis is the weakest chapter of the book. No further

NOTE OF THE STOMACH. A LINGUA. STUDY OF 92 OTHER STOMACHES. MED. WITH CHAPTER ON THE SURGICAL TREATMENT OF STOMACH. BY ALBERT J. SCHLESER. M.D. L.D. IN A. Philokipia. and London W. H. Saunders. Comp. by G. D.

support of this criticism is necessary than the mere mention that Smithies does not even suggest pernicious anemia or tuberculosis in any of his differentiations. If one calls to mind the chapter on differential diagnosis in Schmidt's book on *Tumors of the Abdominal Viscera* he will at once appreciate how far short Smithies has fallen. The final chapter on the non-surgical treatment of cancer of the stomach is admirably done and constitutes a most valuable part of the volume. It is unfortunate that Smithies, in describing the technique of transfusion in inoperable cases, describes the method as the Percy-Cook method. The credit should go to Kilmpton to whom it properly belongs. The chapter on the surgery of gastric cancer written by Dr. Ochsner is adequate and particularly well illustrated. One misses, with regret, any mention of the recently proposed Polya method of gastric resection. Comment on this operation by Ochsner would have been particularly valuable.

On the whole the book fulfills its purpose well in demonstrating the value of an intensive, well correlated study of clinical material. The only thing lacking is just a bit more of Smithies himself for the sake of color and interest. A strongly personal note adds conviction as well as salt and spice to a book. On pages 67 and 68 the author rises in righteous wrath against the fox trot bunny hug consists *et al* and states in most unequivocal terms his own ideas regarding what constitutes proper physical examination. We should have enjoyed a thicker tudding of the volume with this same style of writing.

THE new third edition of Edwards' *Practice of Medicine* has been reviewed for us by Dr. Mandel in the following words:

"The book is practically rewritten and rearranged to conform with the more recent classification of diseases. Much new matter has been added. Especially commendable is the space devoted to diagnosis. The differential diagnostic tables covering diseases of the heart, liver, kidneys, blood states, etc. are complete and practical and should be of value to the student and teacher. Surgical indications in border line cases, statistics, medical and surgical, and the extensive bibliography enhance the value of this new work and create a special appeal to the surgeon.

"Treatment is outlined in great detail. This is particularly true in the treatment of cardiac insufficiency, syphilis and tuberculosis. The dietetic treatment of nephritis and diabetes approaches in completeness that which we might expect in a work on dietetics. The discussion of the physiological action and therapeutic indications of the more commonly used drugs is another unique and laudable feature of the volume.

In this edition as in the two previous editions the author has succeeded in subordinating the theoretical and eliminating the obsolete, thereby giving us a *Practice* which is complete, practical and up-to-date. An ideal text-book for students, a necessity for the general practitioner and a valuable addition to the library of the teacher.

A. T. THE NEW PRACTICE OF MEDICINE. By Arthur T. Evans, M.D. Third Edition. Philadelphia: Lea & Febiger, 1916.

BOOKS RECEIVED

Books received are acknowledged in this department, and such acknowledgment must be regarded as sufficient return for the courtesy of the sender. Selections will be made for review in the interests of our readers and as space permits.

THE DUCTLESS GLANDULAR DISEASES. By Wilhelm Faltz. Translated by Milton K. Meyers, M.D. Second edition. Philadelphia: P. Blakiston, Son & Co., 1916.

MANUAL OF OPERATIVE SURGERY. By John Fairbairn Binnie, A.M., C.M. (Aberdeen). F.A.C.S. Seventh edition, revised and enlarged. Philadelphia: P. Blakiston's Son & Co., 1916.

A TEXTBOOK OF FRACTURES AND DISLOCATIONS. With special reference to their Pathology, Diagnosis, and Treatment. By Kellogg Speed, S.B., M.D. F.A.C.S. Philadelphia and New York: Lea & Febiger, 1916.

MANUAL OF PRACTICAL GYNECOLOGY. By M. J. Selfert, A.B. M.D. F.A.C.S. Chicago: Chicago Medical Book Company, 1915.

THE AMERICAN ATLAS OF STENOGRAPHIC RADIOLOGY. A quarterly. Edited and published under auspices of the New York Roentgen Society. Troy, New York: The Southworth Company, 1916.

SUGARS IN URINE. By Alfred J. Hull, F.R.C.S. London: J. & A. Churchill, 1916.

THE ART OF ANESTHESIA. By P. J. Flagg, M.D. Philadelphia and London: J. B. Lippincott Company, 1916.

THE MORTALITY FROM CANCER THROUGHOUT THE WORLD. By Frederick L. Hoffman, LL.D. F.S.S. F.A.S.A. Newark, New Jersey: The Prudential Press, 1915.

PAINLESS CHILD BIRTH. EUTOXIC AND NITROX OXYGEN ANALGESIA. By Carl Henry Davis, A.B. M.D. Chicago: Forbes & Company, 1916.

THE CLINIC OF JOHN B. MURPHY, M.D. at MERCY HOSPITAL, CHICAGO. February and April, 1916. Philadelphia and London: W. B. Saunders Co., 1916.

NEW AND NON-OFFICIAL REMEDIES, 1916. Chicago: American Medical Association, 1916.

TRANSACTIONS OF THE AMERICAN ASSOCIATION OF GENTILE-URINARY SURGEONS, 1915. New York: Frederick H. Hitchcock, 1916.

TREATISE ON FRACTURES. By John B. Roberts, A.M., M.D., F.A.C.S., and James A. Kelly, A.M., M.D. Philadelphia and London: J. B. Lippincott Co., 1916.

THE JOHN HOPKINS HOSPITAL REPORTS, Vol. XVII. Baltimore: The Johns Hopkins Press, 1916.

ADVISORY COMMITTEE OF CIVILIAN PHYSICIANS AND SURGEONS
ON MEDICAL PREPAREDNESS

INFORMALLY it was brought to the attention of a number of civilian physicians that a consulting committee on medical preparedness would be desirable. This resulted in a suggestion that the presidents of the American Medical Association, the American Surgical Association, the Congress of American Physicians and Surgeons, the Clinical Congress of Surgeons of North America, and the American College of Surgeons should jointly appoint an ad interim committee which could co-operate in developing the civilian and reserve medical resources of the country to the highest point of efficiency. As a result of these suggestions the following committee was appointed in the manner indicated: the presidents of the various societies acting as members of the committee:

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John F Binnie Kansas City Mo
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George E Brewer New York City
George W Crile Cleveland
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Albert Vander Veer Albany N Y
Victor C Vaughan Ann Arbor Mich

This Committee met in Chicago for organization on April 14. Dr William J Mayo of Rochester Minn was elected Chairman of the Committee. Dr Frank F Simpson of Pittsburgh Secretary and an Executive Committee chosen as follows:

George E Brewer	William J Mayo
George W Crile	Franklin H Martin
J M T Finney	Frank F Simpson
Robert G LeConte	William S Thayer
Fred B Lund	Albert Vander Veer

On April 20 the Executive Committee met in Washington and presented in person to President Wilson the following memorandum:

WASHINGTON D C April 20 1916

Dear Mr President—We the under-signed acting as a committee on behalf of four national societies to wit the American Medical Association the Congress of American Physicians and Surgeons the Clinical Congress of Surgeons of North America and the American College of Surgeons representing an aggregate membership of 90 000 medical men have the honor respectfully to present our greeting and to tender to the Federal Government our services toward the medical welfare of the Army and Navy being impelled so to do by the following considerations:

1 In times of peace as well as in times of war the medical profession as above represented holds itself in readiness out of a spirit of patriotism and of co-operation to serve the best interests of the Federal Government

2 The European war especially during its first six months demonstrated a greater need both of medical supplies and of more efficient organization of medical resources, in connection with military and naval activities than was formerly deemed necessary or adequate

3 Every soldier and sailor in the service of the Federal Government is entitled at all times to protection in sanitary matters and to prompt medical and surgical care

Prompted therefore by these considerations the medical profession as above represented respectfully offers its services toward the well being of the army and navy departments. Among the services which at this time the above named organizations specifically tender their co-operation in conjunction with existing facilities of the Army and Navy for such purposes are:

1 To establish through their respective membership and their affiliations with local medical societies of the states and territories an or

ganization that would be in a position to make a comprehensive survey of the medical resources of the country

2 To make a complete invoice of such resources available in peace and in the emergency of war This invoice would include not only the names of men available for field or home duty who are trained in the specialties of medicine surgery and sanitation but it would also include the extensive equipment under the control of these men such as hospital facilities and lists of trained nurses

3 To aid in the public health service in sanitation, quarantine, and hygiene of the troops to aid in the inspection of camps and ports to analyze water sources and supply systems to study effects of climates, exposure, diet etc all designed for the welfare of the individuals enlisted in the Army and Navy Departments

The medical profession as above represented respectfully submits that thorough organization of the civilian and reserve medical resources of the country are of primary importance in the proper preparedness of the country It does not however here and now offer or imply any recommendation as to the national policy for preparedness beyond adequate sanitary medical and surgical protection of those who may be enlisted in the army and navy departments

Respectfully submitted

WILLIAM J MAYO
Chairman Committee of American Physicians

ALBERT VANDER VILK
President American Medical Association

WILLIAM S THAYER
President Congress of American Physicians and Surgeons

FRED B LUND
President Clinical Congress of Surgeons of North America

J M T FINNEY
President American College of Surgeons

FRANK F SIMPSON
Secretary Committee of American Physicians

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GEORGE W CRILE
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VICTOR C VAUGHAN
G E DESCHWENITZ

The General Committee in pursuance of its plan for a general survey of the medical resources of the country has selected a committee in each state to aid in the work These state committees are listed below Members of the General Committee are also members of the state committees in the states in which they reside To the General Committee have been added the following as members ex officio

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W C BRAINARD Surgeon General United States Navy

Rupert Blue Surgeon General, United States Public Health Service

Colonel Jefferson R Kean

Major Herbert J Nolle

President American Medical Association

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President Congress of American Physicians and Surgeons

President Clinical Congress of Surgeons of North America

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Seventh Annual Session Philadelphia October 23 to 28 1916

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PLANS FOR THE PHILADELPHIA MEETING

ON the following pages is presented a preliminary program of the evening meetings to be held during the week of the Clinical Congress of Surgeons in Philadelphia. All of these meetings with the exception of the public meeting on Friday evening are to be held in the Ball Room of the Bellevue Stratford. On Friday evening in Witherspoon Hall located only a short distance from the Bellevue Stratford there will be an open session to which the public will be invited. Questions of great interest to the public will be discussed by men who can speak with authority concerning the problems presented. On three evenings of the week there will be separate meetings for the section on surgery of the eye ear nose and throat the program for which will be published in an early issue. These meetings will also be held at the Bellevue Stratford.

It is evident from the number of registrations already received at the office of the

Secretary General that the limit of membership fixed for the Philadelphia session will be reached within a short time. Bearing in mind that several hundred surgeons who wished to attend the Boston meeting last October were disappointed because their registrations were received too late it is urged upon those surgeons who wish to attend the Philadelphia meeting but who have not sent in their registrations that application should be made immediately to the Secretary General Dr Franklin H. Martin 30 N Michigan Ave Chicago Illinois. When the required number of registrations has been received no further applications can be accepted.

A careful survey of the operating amphitheatres lecture rooms and laboratories of the several medical schools and hospitals in Philadelphia as to their capacity for accommodating visiting surgeons, has been made and the limit of attendance based upon this survey. The

popularity of these clinical meetings has become so great that the plan of limiting the attendance and requiring advance registration was decided upon to prevent overcrowding. This plan assures accommodations at the clinics for all who hold membership cards and has worked satisfactorily at the two previous meetings, in London in 1914 and in Boston in 1915.

THE CLINICAL PROGRAM

The schedule of clinics and demonstrations to be given by the clinicians of Philadelphia during the week of October 23d as published in these pages is a tentative one and is to be amplified and corrected from month to month as the work of the Committee on Arrangements progresses, so that the final program will properly represent the clinical work of the Philadelphia surgeons. The Committee on Arrangements has planned for a complete showing of Philadelphia's clinical facilities in every department of surgery including gynecology obstetrics, genito-urinary surgery orthopedics, surgery of the eye, ear nose, and throat, together with many demonstrations on borderline subjects.

MEMBERSHIP—REGISTRATION FEE

The Constitution of the Congress provides that all subscribers to the official journal *SURGERY GYNECOLOGY AND OBSTETRICS* are members of the Congress and that such other legally qualified practitioners as are in good standing in their own communities may become members upon registering at an annual meeting.

The constitution also provides that a registration fee shall be required of each member attending an annual meeting, there being no annual dues for members of the Congress. The registration fees provide funds to meet the expense of preparing for and conducting the

annual meetings so that no financial burden is imposed upon members of the profession in the city entertaining the Congress.

HEADQUARTERS

Headquarters will be established at the Bellevue-Stratford where the Ball Room, Clover Room, Red Room Green Room, and adjacent foyers and smaller rooms have been reserved for the use of the Congress. These rooms are located on the second floor of the hotel and provide ample space for registration rooms and ticket bureau, bulletin boards, etc. the Ball Room being used for the evening meetings.

Headquarters will be open on the afternoon of Saturday October 21st, and on Sunday the 22d, for the registration of members. The program of clinics and demonstrations for Monday will be bulletined on Saturday afternoon, and on each afternoon, beginning on Monday the complete program for the next day's clinics will be posted on bulletin boards in headquarters. A printed program will be issued each morning and special tickets for all clinics and demonstrations will be issued to members at 8 a.m. each day.

SPECIAL TICKETS

The use of special tickets at previous sessions has fully demonstrated the efficacy of this method of providing for the distribution of members among the various clinics. To prevent overcrowding, tickets for any clinic or demonstration are limited in number to the actual capacity of the room in which the clinic or demonstration is to be given. These special tickets will be issued at 8 o'clock each morning for the clinics and demonstrations to be held that day a complete clinical schedule having been posted on the bulletin board on the afternoon of the preceding day and a printed schedule of the clinics distributed early each morning.

PRELIMINARY CLINICAL PROGRAM

GENERAL SURGERY

Monday

CHARLES H. FRAZIER — University Hospital — 9 to 12
 T. TURNER THOMAS — University Hospital — 3 to 4
 GEORGE C. ROSS — German Hospital — 9
 A. D. WHITE — German Hospital — 10
 JOHN B. DEEVER — German Hospital — 12
 E. G. ALEXANDER — Episcopal Hospital — 10 to 1
 HARRY C. DEEVER — Episcopal Hospital — 1 to 5
 W. WAYNE BABCOCK — Samaritan Hospital — 9 to 10
 M. BREHEND — Jewish Hospital — 2 to 5
 KATE W. BALDWIN — Women's Hospital — 3
 LEVI J. HUNTER — Methodist Episcopal Hospital — 1

Tuesday

H. R. OWEN — Philadelphia General Hospital — 11
 H. R. LOOK — Philadelphia General Hospital — 10 to 4
 J. B. CARRETT — University Hospital — 9 to 1
 A. C. WOOD — University Hospital — 10 to 12
 W. WAYNE BABCOCK — Samaritan Hospital — 9 to 1
 ALFRED HILTZBERG — Mt. Sinai Hospital — 10 to 12
 LEON BREXMAN — Mt. Sinai Hospital — 1 to 3
 A. P. C. ARTHUR — Episcopal Hospital — 9 to 1
 L. H. MOTTCHILLER — Episcopal Hospital — 10 to 4
 NATHANIEL GINSBURG — Jewish Hospital — 9 to 12
 WILLIAM H. TELLER — Jewish Hospital — 10 to 5
 A. C. WOOD — Howard Hospital — 9
 J. M. BALDWIN — Methodist Episcopal Hospital — 11
 SAMUEL McCLAREY III — Oncologic Hospital — 10 to 4

Wednesday

EDWARD MARTIN — University Hospital — 9 to 12
 E. L. CLARSON — University Hospital — 10 to 1
 W. P. HEARN — Philadelphia General Hospital — 9
 CHARLES HIRSCH — Mt. Sinai Hospital — 10 to 12
 A. P. C. ARTHUR — Episcopal Hospital — 9 to 10
 NATHANIEL GINSBURG — Jewish Hospital — 9 to 12
 M. BREHEND — Jewish Hospital — 1 to 5
 W. B. VAN LENNY and H. L. NORTROP — Hahnemann Hospital — 1 to 30
 FRANCES SPRAGUE — Women's Hospital — 5
 LEVI J. HUNTER — Methodist Episcopal Hospital — 1
 WILLIAM A. STEEL — Samaritan Hospital — 9 to 11
 JOHN A. BOGER — Stetson Hospital — 10
 JOHN B. DEEVER — German Hospital — 12

Thursday

T. TURNER THOMAS — Philadelphia General Hospital — 9 to 11
 W. WAYNE BABCOCK — Samaritan Hospital — 9 to 12
 JOHN B. DEEVER — German Hospital — 1
 A. D. WHITE — German Hospital — 9
 GEORGE C. ROSS — German Hospital — 10
 J. M. BALDWIN — Methodist Episcopal Hospital — 11

CHARLES H. FRAZIER — University Hospital — 9 to 12
 C. P. MUELLER — University Hospital — 1 to 2
 E. G. ALEXANDER — Episcopal Hospital — 11 to 1
 HARRY C. DEEVER — Episcopal Hospital — 1 to 5
 ALFRED HILTZBERG — Mt. Sinai Hospital — 10 to 12
 NATHANIEL GINSBURG — Mt. Sinai Hospital — 2 to 4
 J. M. FRANKLIN — Jewish Hospital — 9 to 12
 WILLIAM H. TELLER — Jewish Hospital — 10 to 5
 W. B. VAN LENNY — Hahnemann Hospital — 1
 A. C. WOOD — Howard Hospital — 9

Friday

JOHN B. DEEVER — University Hospital — 9 to 12
 DANIEL B. PRZYBYL — University Hospital — 10
 LEVI J. HUNTER — Methodist Episcopal Hospital — 1
 A. P. C. ARTHUR — Episcopal Hospital — 9 to 1
 MAX STALLER — Mt. Sinai Hospital — 9 to 12
 LEON BREXMAN — Mt. Sinai Hospital — 10 to 4
 W. WAYNE BABCOCK — Samaritan Hospital — 9 to 12
 NATHANIEL GINSBURG and M. M. FRANKLIN — Jewish Hospital — 9 to 1
 WILLIAM H. TELLER and M. BREHEND — Jewish Hospital — 1 to 5
 KATE W. BALDWIN — Women's Hospital — 3
 H. L. NORTROP and G. A. VAN LENNY — Hahnemann Hospital — 1 to 30
 GEORGE C. ROSS — St. Louis Hospital — 10
 SAMUEL McCLAREY III — Oncologic Hospital — 2 to 4

Saturday

W. WAYNE BABCOCK — Samaritan Hospital — 9 to 1
 JOHN B. DEEVER — German Hospital — 12
 LEVI J. HUNTER — Methodist Episcopal Hospital — 1
 THOMAS R. NEILSON — Episcopal Hospital — 11 to 3

Days and Hours to be Announced

LEON BREXMAN — St. Agnes Hospital.
 J. CHALMERS DALOWA — Jefferson Hospital.
 HARRY C. DEEVER — Women's College and Kensington Hospitals.
 GEORGE M. DORRANCE — St. Agnes Hospital.
 M. M. FRANKLIN — St. Joseph's Hospital.
 JOHN GIBSON — Jefferson Hospital.
 EDWARD B. HODGE — Presbyterian Hospital.
 JOHN F. A. JONES — St. Joseph's Hospital.
 J. H. JORSON — Presbyterian and Polyclinic Hospitals.
 JAMES A. KELLY — St. Joseph's Hospital.
 ERNEST LAPLACE — Medico-Chirurgical Hospital.
 G. P. MUELLER — St. Agnes Hospital.
 CHARLES NARBAU — St. Joseph's Hospital.
 FRANCIS T. STEWART — Jefferson Hospital.
 WILLIAM J. TAYLOR — St. Agnes Hospital.
 H. R. WHEATON — Presbyterian Hospital.

GYNECOLOGY AND OBSTETRICS

Monday

THEO A. ERCK — Gynecologic Hospital — 10 to 1
 BARTON COOKE HIRST and JOHN COOKE HIRST — Howard Hospital — 11

E. E. MONTGOMERY — Jefferson Hospital — 1 to 1
 C. B. LONG ECKER — Oncologic Hospital — 5
 J. C. HUNTER — Samaritan Hospital — 12 to 1
 F. M. FISHER — St. Agnes Hospital — 9 to 1

SURGERY GYNECOLOGY AND OBSTETRICS

WILLIAM E. TRACY — Stetson Hospital — 9 30.
 WILLIAM D. CULLEN — West Philadelphia General Homeopathic Hospital — 0.
 ANNA STEWART COOKE — Woman Hospital — 9.
 ANNA H. LOCKERY — Woman's Hospital — 0.
 JOHN G. CLARK and staff — University Hospital — 9 to 2.

Tuesday

GEORGE W. OUTERBRIDGE — Gynecean Hospital.
 BROOKER M. ABERNETHY — Gynecean Hospital.
 D. B. JAMES and N. F. LAKE — Hahnemann Hospital — 30.
 EDWARD P. DAVIS — Jefferson Hospital —
 E. MONTGOMERY — Jefferson Hospital — to
 WILLIAM E. PARKER — Kensington Hospital — 1
 W. R. NICHOLSON — Methodist Episcopal Hospital — 9.
 RICHARD C. NORRIS — Methodist Episcopal Hospital —
 JOHN H. GRIVIN and GEORGE E. SCHOENMAKER — Presbyterian Hospital — 1
 WILMER KRUSEN — Samaritan Hospital — to
 JOHN A. MCGILVER — St. Agnes' Hospital — 1.
 P. BROOKER BLAND — St. Joseph's Hospital.
 BROOKER M. ABERNETHY — Stetson Hospital — 9.
 ANTON COOKE HIRST — University Hospital — 9.
 ANNA H. LOCKERY — West Philadelphia Hospital for Women — to 1
 ANNA W. GRIM — Woman Hospital — 9.
 LARIN K. FOREMAN — Woman's Hospital — 0.

Wednesday

THOMAS A. ERICK — Gynecean Hospital — to 1.
 ANTON COOKE HIRST and JOHN COOKE HIRST — Howard Hospital — 11.
 E. MONTGOMERY — Jefferson Hospital — to
 P. DAVIS — Philadelphia General Hospital — to 4.
 C. APPLEGATE — Samaritan Hospital — to 2.
 C. HANCOCK — Samaritan Hospital — to
 JOHN A. MCGILVER — St. Agnes' Hospital — 1.
 BROOKER BLAND — St. Joseph's Hospital.
 BROOKER M. ABERNETHY — University Hospital — 9 to
 ANNE M. PURCELL — Woman's Hospital — 0.

Thursday

GEORGE W. OUTERBRIDGE — Gynecean Hospital.
 BROOKER M. ABERNETHY — Gynecean Hospital.
 D. B. JAMES and N. F. LAKE — Hahnemann Hospital — 30.
 JOHN A. MCGILVER — Jefferson Hospital — to
 W. R. NICHOLSON — Methodist Episcopal Hospital — 9.
 RICHARD C. NORRIS — Methodist Episcopal Hospital —
 C. B. LORING — Oncologic Hospital — 3.
 J. M. FRIEZE — Philadelphia General Hospital — to 4.
 JOHN H. GRIVIN and GEORGE E. SCHOENMAKER — Presbyterian Hospital — 2.
 WILMER KRUSEN — Samaritan Hospital — to
 JOHN A. MCGILVER — St. Agnes' Hospital.
 P. BROOKER BLAND — St. Joseph's Hospital.
 STEPHEN E. TRACY — Stetson Hospital — 9 30
 JOHN G. CLARK and staff — University Hospital — 9.
 WILLIAM D. CULLEN — West Philadelphia General Homeopathic Hospital — 0.
 SARAH H. LOCKERY — West Philadelphia Hospital for Women — 1 to
 MARY T. MILLER — Woman Hospital — 9.
 SARAH H. LOCKERY — Woman Hospital — 0.

Friday

THOMAS A. ERICK — Gynecean Hospital — to
 ANTON COOKE HIRST and JOHN COOKE HIRST — Howard Hospital —
 WILLIAM E. PARKER — Kensington Hospital —
 F. C. HANCOCK — Samaritan Hospital — to
 JOHN A. MCGILVER — St. Vincent Hospital.
 M. LOUISER DILL — Woman's Hospital — 9.
 CATHERINE MACFARLANE — Woman's Hospital — 0.

Saturday

P. BROOKER BLAND — Jefferson Hospital — 1 to
 ANTON COOKE HIRST — University Hospital — 9.
 JOHN G. CLARK and staff — University Hospital — 9 to
 WILMER KRUSEN — Samaritan Hospital — 1 1

Days to be announced

GEORGE M. BOYD — Medico-Chirurgical and Philadelphia Lying in Charity Hospital.

ORTHOPEDIC SURGERY

Monday

T. RUSS and staff — Methodist Episcopal Hospital — 4 to 5.
 B. GILL — Episcopal Hospital — to 5.

Tuesday

I. M. FRANKLIN — Philadelphia General Hospital — to
 T. RUSS and staff — Methodist Episcopal Hospital — 4 to 5.
 I. A. WILSON and staff — Jefferson Hospital — to
 J. T. YLON and staff — Orthopedic Hospital — to
 P. MANK — Medico-Chirurgical Hospital — to 3
 ARRY HUNTER and staff — Samaritan Hospital — to 4.
 G. DAVIS and staff — University Hospital — 1 3

Wednesday

G. DAVIS and staff — University Hospital — to 4.
 T. RUSS and staff — Methodist Episcopal Hospital — 4 to 5.
 B. GILL — Episcopal Hospital — 9 to

Thursday

I. A. WILSON and staff — Jefferson Hospital — to 1.
 G. G. DAVIS and staff — Orthopedic Hospital — to
 J. P. MANK — Medico-Chirurgical Hospital — 1 to 3
 J. K. YOUNG and staff — Polyclinic Hospital — 3 to 5.
 G. G. DAVIS and staff — University Hospital — to 3

Friday

J. T. RUSS and staff — Methodist Episcopal Hospital — 4 to 5.
 G. G. DAVIS — Widener School — 1 4.
 G. G. DAVIS and staff — University Hospital — 1 to 3
 J. K. YOUNG — Philadelphia General Hospital — to 4.
 J. T. RUSS — Philadelphia General Hospital — 1
 DOUGLAS J. MONTGOMERY — Hahnemann Hospital —

Saturday

A. P. C. ABERNETHY and staff — Orthopedic Hospital — 9 to
 I. A. WILSON and staff — Jefferson Hospital — to

ROENTGENOLOGY

M m

- SIDNEY FELDSTEIN — Jewish Hospital — 3 to 4. Oblique and intestinal fractures.
 W S NEW MET — Jewish Hospital — 3 to 4. Bone lesions sinus cases (in conjunction with Dr Stauffer).
 GEORGE E PFUHL — Medical-Chirurgical Hospital — 3 to 4. Roentgen diagnosis in the treatment of deep-seated malignant disease.
 A G MILLER — German Hospital — 3 to 4.

T s d

- DAVID R B WEN — Pennsylvania Hospital — 3 to 4. Fractures.
 FREDERICK C HOLT — 438 N 5th St — 3 to 4. Organ lesions of the stomach and duodenum.
 W F MANLEY — Jefferson Hospital — 3 to 4. Pilocop and peliography.
 W S NEW MET — Presbyterian Hospital — 3 to 4. Bone lesions sinus cases (in conjunction with Dr Stauffer).
 A C MILLER — German Hospital — 3 to 4.
 GEORGE E PFUHL — Medical-Chirurgical Hospital — 3 to 4. Roentgen diagnosis of gastric and duodenal lesions. Lantern slide demonstration.

Wed and

- W F MANLEY — Jefferson Hospital — 3 to 4. Fluoropy of the gastro-intestinal tract.
 A C MILLER — German Hospital — 3 to 4.
 W S NEW MET — Presbyterian Hospital — 3 to 4. Bone lesions sinus cases (in conjunction with Dr Stauffer).
 GEORGE E PFUHL — Medical-Chirurgical Hospital — 3 to 4. Roentgen diagnosis of gall-stones.
 DAVID K BOWEN — Pennsylvania Hospital — 3 to 4. Bone and joint diseases.
 M K FISHER — St Louis Hospital — 3 to 4. Int diseases and radiography of the urinary tract.
 JACOB W FRANK — Hahnemann Hospital — 3 to 4.

Th and

- DAVID R B WEN — Pennsylvania Hospital — 3 to 4. Surgical diseases of the thorax.

- SIDNEY FELDSTEIN — Jewish Hospital — 3 to 4. Tuberculosis of the lungs.
 FREDERICK C HOLT — 438 N 5th St — 3 to 4. Intestinal pathology.
 A C MILLER — German Hospital — 3 to 4.
 W F MANLEY — Jefferson Hospital — 3 to 4. Brain tumor and intra cranial lesion.
 W S NEW MET — Presbyterian Hospital — 3 to 4. Bone lesions sinus cases (in conjunction with Dr Stauffer).

Fri

- DAVID R B WEN — Pennsylvania Hospital — 3 to 4. The management of small and medium sized hospital roentgen laboratories.
 W F MANLEY — Jefferson Hospital — 3 to 4. Roentgen examination of teeth as an aid to surgical diagnosis.
 W S NEW MET — Presbyterian Hospital — 3 to 4. Bone lesions sinus cases (in conjunction with Dr Stauffer).
 A C MILLER — German Hospital — 3 to 4.
 GEORGE E PFUHL — Medical-Chirurgical Hospital — 3 to 4. Electro-coagulation in the treatment of malignant disease.
 M K FISHER — St Louis Hospital — 3 to 4. Int diseases and radiography of the urinary tract.
 JACOB W FRANK — Hahnemann Hospital — 3 to 4.

Sat

- A C MILLER — German Hospital — 3 to 4.
 DAVID R B WEN — Pennsylvania Hospital — 3 to 4. The management of small and medium-sized hospital roentgen laboratories.
 W S NEW MET — Presbyterian Hospital — 3 to 4. Bone lesions sinus cases (in conjunction with Dr Stauffer).
 D J T B E I O W R D
 HENRY K PANCOAST — University Hospital — 3 to 4. Radium therapy of 4 Gastro-intestinal tract.
 W S NEW MET — Jefferson Hospital — 3 to 4. Deep vent geotherapy and radium therapy in advanced cancer cases.

GENITO-URINARY SURGERY

- L F ALCRAFT — Hahnemann Hospital — Tuesday.
 H M CHRISTIAN — Medical-Chirurgical Hospital.
 H R LOUGHEAD — Jefferson Hospital.
 T R NELSON — University Hospital.
 L F ALCRAFT — Women's Homeopathic Hospital.

- E H STIER — Philadelphia General Hospital.
 E H STIER and staff — University Hospital.
 B A THOMAS — Philadelphia Clinic Hospital.
 A A THOMAS and WILLIAM MACKENNEY — German Hospital — Monday and Friday 4 to 5.

LABORATORY DEMONSTRATIONS

- D J T B E I O W R D
 DAVID R B WEN — German Hospital — Monday and Friday.
 W F MANLEY — German Hospital — Monday and Friday.
 DR. APPEL — University of Berlin and Hahnemann Hospital — Wednesday and Friday.
 J F NEW MET — Medical-Chirurgical Hospital — Wednesday.
 Tumor growth and necrosis.

- C B LANE — Oncologic Hospital — Monday and Tuesday 4 to 5. Demonstration of photomicrographs and color plates with special reference to hospital photography.
 G S S — Oncologic Hospital — Wednesday and Friday. Laboratory technique especially new developments in the Abderhalden reaction.

SURGERY OF THE EYE

Monday

WILLIAM CAMPBELL POSEY — Howard Hospital —
 S. LEWIS ZIEGLER — Wills Eye Hospital —
 SAMUEL D. RUSLEY — Wills Eye Hospital —
 McCLENNY RADCLIFFE — Wills Eye Hospital —
 WILLIAM M. SWEET — Wills Eye Hospital — 3
 PAUL POWITUS — Wills Eye Hospital — 2.
 L. PETER — Polyclinic Hospital —
 WILLIAM T. SPOONMAKER — German Hospital —
 PAUL POWITUS — St. Joseph's Hospital — 3:30.
 FREDERICK KRAUSE — Episcopal Hospital —
 LOUIS LOVE — St. Mary's Hospital — 3
 AARON BRAV — Jewish Hospital — 3.
 E. D. FUNK — Jefferson Hospital — 2.

Tuesday

E. D. FUNK — Jefferson Hospital — 2.
 WILLIAM T. SPOONMAKER — Pennsylvania Hospital — 2.
 GEORGE S. CRAMPTON — Pennsylvania Hospital — 2.
 PHILIP H. MOORE — Methodist Episcopal Hospital — 4.
 WILLIAM W. SPRAEDMAN — Habesmann Hospital — 2.
 WILLIAM CAMPBELL POSEY — Wills Eye Hospital —
 P. N. K. SCHWENK — Wills Eye Hospital — 30.
 WILLIAM ZENTMAYER — Wills Eye Hospital —
 T. B. HOLLOW — Polyclinic Hospital —
 MARY BUCHANAN — Women's Hospital —
 G. OZAM KING — Episcopal Hospital — 2.
 WENDELL REIMER — Samaritan Hospital — 4 to 5
 AARON BRAV — Leabson Hospital — 2.
 H. F. HANVELL — Philadelphia General Hospital — to 3
 McCLENNY RADCLIFFE and J. M. GRISCOM — Presbyterian Hospital —
 G. P. FRANKLIN — Stetson Hospital —
 G. E. DE SCHWENCK and J. T. CARPENTER — University Hospital — 3
 G. E. DE SCHWENCK — University Hospital — 3

Wednesday

WILLIAM T. SPOONMAKER — German Hospital —
 CHARLES W. LEFEBVRE and S. J. GETTELSON — Mt. Sinai Hospital — 3.
 E. D. FUNK — Jefferson Hospital — 2.
 L. WENSTER FINE — Medico-Chirurgical Hospital —
 S. LEWIS ZIEGLER — Wills Eye Hospital —
 SAMUEL D. RUSLEY — Wills Eye Hospital —
 McCLENNY RADCLIFFE — Wills Eye Hospital — 3.
 WILLIAM M. SWEET — Wills Eye Hospital —
 PAUL POWITUS — Wills Eye Hospital — 2.
 WENDELL REIMER — Polyclinic Hospital — 2.
 WILLIAM T. SPOONMAKER — German Hospital —
 CHARLES J. JONES — St. Joseph's Hospital — 3.
 MIRIAM M. BUTT — Women's Hospital —
 H. G. GOLDREING — Episcopal Hospital —
 LOUIS LOVE — St. Mary's Hospital — 3

J. C. KRIEPE — Jewish Hospital — 3

JOHN W. CROSBY — Philadelphia General Hospital — 2.
 E. A. SHUNWAY — Philadelphia General Hospital — 3.
 T. B. HOLLOW — H. M. LANGDON and CARL WILLIAMS — University Hospital — 5.

Thursday

PHILIP H. MOORE — Methodist Episcopal Hospital — 4
 J. A. KEARNEY — St. Agnes' Hospital — 3.
 J. C. KRIEPE — Jefferson Hospital — 2.
 E. D. FUNK — Jefferson Hospital —
 WILLIAM T. SPOONMAKER — Pennsylvania Hospital — 2.
 GEORGE S. CRAMPTON — Pennsylvania Hospital — 2.
 WILLIAM CAMPBELL POSEY — Wills Eye Hospital —
 P. N. K. SCHWENK — Wills Eye Hospital — 1:30.
 C. P. F. LYN — Stetson Hospital —
 WILLIAM ZENTMAYER — Wills Eye Hospital —
 L. APPELMAN — Polyclinic Hospital —
 MARY BUCHANAN — Women's Hospital —
 FREDERICK KRAUSE — Episcopal Hospital —
 AARON BRAV — Leabson Hospital — 2.
 JAMES TH. RINGTON and J. M. GRISCOM — Presbyterian Hospital —
 G. E. DE SCHWENCK and E. A. SHUNWAY — University Hospital — 3.
 H. F. HANVELL — Philadelphia General Hospital — to 3

Friday

H. F. HANVELL and WILLIAM M. SWEET — Jefferson Hospital — 45
 S. LEWIS ZIEGLER — Wills Eye Hospital —
 SAMUEL D. RUSLEY — Wills Eye Hospital —
 McCLENNY RADCLIFFE — Wills Eye Hospital —
 P. OL. POWITUS — Wills Eye Hospital —
 E. A. SHUNWAY and H. M. LANGDON — Children's Hospital —
 WENDELL REIMER — Polyclinic Hospital —
 L. PETER — Polyclinic Hospital — 3
 WILLIAM T. SPOONMAKER — German Hospital —
 CHARLES J. JONES — St. Joseph's Hospital — 3
 G. OZAM KING — Episcopal Hospital —
 LOUIS LOVE — St. Mary's Hospital — 2.
 E. D. FUNK — Jefferson Hospital — 2.
 AARON BRAV — Jewish Hospital — 3.

Saturday

E. D. FUNK — Jefferson Hospital —
 WILLIAM T. SPOONMAKER — Pennsylvania Hospital —
 GEORGE S. CRAMPTON — Pennsylvania Hospital — 2.
 P. N. K. SCHWENK — Wills Eye Hospital — 30
 WILLIAM ZENTMAYER — Wills Eye Hospital —
 H. G. GOLDREING — Episcopal Hospital —
 AARON BRAV — Leabson Hospital — 2.
 WILLIAM CAMPBELL POSEY — Wills Eye Hospital —

SURGERY OF THE EAR, NOSE, AND THROAT

Monday

CHARLES P. GRAYSON — University Hospital —
 R. SHILLER — Medico-Chirurgical Hospital — 2.
 L. JONES — Philadelphia General Hospital —
 MARGARET BUTLER — Women's Hospital — 2.
 CUTTES EVES — Episcopal Hospital —
 CARLE LEE FELT — Stetson Hospital —

Tuesday

F. R. PACKARD — Pennsylvania Hospital —
 D. B. KYLE — Jefferson Hospital —
 RALPH BUTLER and JAMES A. BARRETT — German Hospital — 30.
 I. G. SEALLCROSS and H. S. WEAVER — Habesmann Hospital — 30.

R SKILLERN — Medico-Chirurgical Hospital — 2
 FRED W SMITH and OSCAR SEELEY — Hahnemann Hospital — 2 30
 CHARLES C BIEDERT — Episcopal Hospital — 2
 LAURA E. HUNT — Woman's Hospital — 2
 WALTER ROBERTS — Methodist Episcopal Hospital — 3

Wednesday

WALTER ROBERTS — Polyclinic Hospital — 2
 RALPH BUTLER — Polyclinic Hospital — 3
 R. SKILLERN — Medico-Chirurgical Hospital — 2
 CARLE LEE FELT — Nelson Hospital — 2
 I G. SHALLCROSS and H. S. WEAVER — Hahnemann Hospital — 2 30
 FRED W SMITH and OSCAR SEELEY — Hahnemann Hospital — 30
 CURTIS EVES — Episcopal Hospital — 3
 HENRY C OTT — Oncologic Hospital — 2

Thursday

I G SHALLCROSS and H. S. WEAVER — Hahnemann Hospital — 2 30.

GEORGE M COATES — Polyclinic Hospital — 1
 FRED W SMITH and OSCAR SEELEY — Hahnemann Hospital — 2 30
 CHARLES C BIEDERT — Episcopal Hospital — 2
 WALTER ROBERTS — Methodist Episcopal Hospital — 3

Friday

SETH MACLURE SMITH — Jefferson Hospital — 2 30
 GEORGE M COATES — Pennsylvania Hospital — 1
 I G SHALLCROSS and H S WEAVER — Hahnemann Hospital — 2 30
 FRED W SMITH and OSCAR SEELEY — Hahnemann Hospital — 2 30
 GILBERT J. Pallen — Hahnemann Hospital
 CHARLES C BIEDERT — Episcopal Hospital — 2
 MARGARET WARLOW — Woman's Hospital — 2

Days to be announced

ARTHUR WATSON — Polyclinic Hospital.
 G HUDSON MAKUEN — Polyclinic Hospital.
 ALEXANDER RANDALL — University Hospital.
 CHARLES P GRAYSON — Medico-Chirurgical Hospital

PRELIMINARY PROGRAM OF EVENING SESSIONS

GENERAL SURGICAL DIVISION—In the Ball Room of the Bellevue-Stratford at 8 p m

Presidential Meeting Monday October 2

Address of Welcome ROBERT C LECONTE M D Philadelphia, Chairman of Committee on Arrangements.
 CHARLES H MAYO M D Rochester Minn. Address of returning president
 Inauguration of President FRED BATES LUND M D Boston and Vice Presidents JASPER HALPENNY M D Winnipeg and S M D CLARK M D New Orleans.
 Presidential address by FRED BATES LUND M D Boston The Indications of Cholecystectomy
 J M T FINNEY M D Baltimore Drainage of the Gall Bladder
 CHARLES H MAYO M D Rochester Minn Cholecystostomy vs. Cholecystectomy
 Discussion J C DACOSTA M D Philadelphia, and JOHN B DEEVER M D Philadelphia.

Tuesday October 4

DEAN LE TO M D Chicago Fat and Fascia Transplantation.
 Discussion FRANCIS T STEWART M D Philadelphia.
 C A PORTER M D Boston Surgery of the Peripheral Nerves.
 Discussion CHARLES H FRAZIER, M D Philadelphia and JOHN H GIBBO M D Philadelphia.

Wednesday October 25

J BENTLEY SQUIER M D New York City Kidney Surgery
 WILLIAM F BRAASCH M D Rochester Minn Recent Methods in Kidney Diagnosis.
 BRANFORD LEWIS M D St. Louis Diagnosis of Ureter Diseases with Their Surgery
 J T GERAGHTY M D Baltimore Diseases of the Bladder
 EDWIN BEER, M D New York City Treatment of Neoplasms by the High Frequency Current or Fulguration.
 Discussion EDWARD MARTLE M D Philadelphia.

Thursday October 26

THOMAS S. CULLEN M.B. Baltimore Methods of Draining Where Pelvic Infections Exist.

J. WHITRIDGE WILLIAMS, M.D. Baltimore The Abuse of Cesarean Section.

Discussion EDWARD P. DAVIS, M.D. Philadelphia.

GEORGE G. WARD JR. M.D. New York City Treatment of Inaccessible Vesico-vaginal Fistulae

Discussion JOHN G. CLARK, M.D. Philadelphia.

C. JEFF MILLER, M.D. New Orleans Surgical Treatment of Puerperal Pyemia.

Discussion BARTON C. HIRST, M.D. Philadelphia.

THOMAS J. WATKINS M.D., Chicago Cystocele and Prolapse

Discussion BROOKS M. AMSPACHER, M.D. Philadelphia.

Friday October 27

WILLY MEYER, M.D. New York City Cancer of the Breast.

WILLIAM J. MAYO M.D. Rochester Minn. Cancer of the Stomach

Discussion FREDERICK W. FARHAM, M.D. New Orleans.

GEORGE E. ARMSTRONG M.D. Montreal Canada Cancer of the Large Bowel

Discussion STUART MCGUIRE, M.D. Richmond, and E. WILLYS ANDREWS M.D. Chicago.

HOWARD A. KELLY M.D. Baltimore Treatment of Cancer by Radium.

JAMES T. CASE, M.D. Battle Creek, Mich. Treatment of Cancer by X-ray

Discussion GEORGE E. PFALTZ, M.D. Philadelphia.

Public Meeting Friday October 27 in Witherspoon Hall at 8 p.m.

Under combined auspices of the Philadelphia County Medical Society, the Department of Public Health and Charities, and the Clinical Congress of Surgeons of North America.

WESTON A. PRICE M.D. Cleveland Case of the Teeth (Illustrated by lantern and cinematograph.)

JOSEPH C. BLOODGOOD M.D. Baltimore Diagnosis of Cancer

ROBERT W. LOVETT M.D. Boston Description and Illustration of Cranial Deformities and the Importance of Their Proper Treatment.

International Abstract of Surgery

SUPPLEMENTARY TO
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EDITORIAL ANNOUNCEMENT

From time to time in the history of clinical medicine certain questions come up for intensive discussion appear to be settled temporarily and subside into quiescence only to reappear later as a subject again for forensic debate or laboratory research. Such a theme is that which has recently added considerably to the literature of neurology and gynecology. The relation between gynecological and neurological conditions has been recognized since the earliest days of medical knowledge. It has aroused the keenest discussion at various periods during past generations. Following the claims of Bossi a few years ago fresh interest in this subject was aroused. Today the close study given the ductless glands appears to reveal a closer relationship and to explain this relationship in some degree. It is, therefore timely that a critical review of this abundant literature should be offered to our readers and the INTERNATIONAL ABSTRACT OF SURGERY takes pleasure in announcing that Dr. Richard R. Smith has prepared such a paper to appear in the July issue.

Other collective reviews to be published during the next few months are

Mechanism of Fractures	EMMET REXFORD, M.D. San Francisco
Tuberculosis of the Genito-Urinary Tract	J. H. CUMMINGHAM, JR., M.D. Boston
A Comparison of the Results in the Conservative and Surgical Management of Eclampsia	REUBEN PETERSON, M.D. Ann Arbor, Mich.
Surgery of the Bladder	J. BRITLEY SQUIER, M.D. New York
Cancer Treatment with the X Ray Diathermy and Radium	GUSTAV KOLLECHER, M.D. Chicago
The Status of the Operation for Sterility	V. D. LESTER, M.D. Chicago
Intestinal Obstruction	HARVEY B. STONE, M.D. Baltimore
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INTERNATIONAL ABSTRACT OF SURGERY

JULY 1916

COLLECTIVE REVIEW

THE VERMIFORM APPENDIX

A RÉSUMÉ OF THE LITERATURE

By W. FRANK FOWLER, M.D. ROCHESTER, NEW YORK

THE literature pertaining to the appendix has been extremely illuminating and in many instances conclusive during the past year. It is regrettable that a paper of this character cannot include all the excellent articles which were read in its preparation. The writer considers this compilation amply justified by the statistics of Murphy herein quoted.

ANATOMY

Recent embryologic studies of folds, bands and kinks have again demonstrated that various malpositions of the appendix are dependent upon partial or non rotation of the gut. Schrup (1) reports a case of this character which presented the usual symptoms of appendicitis and cystic ovaries. At operation the cystic ovaries were found in the ovarian region but there was no appendix caecum or ascending colon in the normal position. The jejunum occupied the right half of the abdomen. The caecum was located behind the sigmoid. The appendix was long and congested. There were no adhesions. The mesocolon was apparently attached at the left side of the spinal column. The stomach, heart and liver were in normal positions. A review of the literature convinces Schrup that complete transposition of the viscera is more common than the type which he reports. The pre-operative location of the heart on the right side would suggest the diagnosis in complete transposition. In childhood non-rotation of the colon accounts for unusual appendix positions.

Corner (2) says: Clinically it is frequent to find in children that the caecum and appendix have not reached the iliac fossa, but have been delayed in their descent or become situated in the umbilical region. It is unusual for the left side of the abdomen or the pelvis to be reached. Appendicitis in the young is commonly atypical and it is necessary to rely on the generality that acute abdominal disease in children is probably appendicitis. Other causes of malposition of the appendix in the adult are an abnormally long mesocolon and an unusually long appendix which may reach to the left side.

Palamountain (3) reports a case of another type. His patient was a married woman, aged 18, a nullipara who had had irregular menstruation for the past year. She was awakened by a sudden severe colicky pain in the midabdomen which continued all night and was accompanied by vomiting. The pain was localized in the left iliac region and continued all the next day with occasional vomiting. Castor oil and hot applications did not relieve the pain. The next day she was driven to town. Examination revealed a medium sized woman in severe pain. She leaned to the left side and kept the left thigh flexed. Menstruation had been delayed two days. Her temperature was 99.5, pulse 120. The abdomen was tympanitic and extremely tender over the left side. Percussion was almost unbearable. Muscle spasm was pronounced. There was constant pain over the left lower abdomen. The uterus was slightly enlarged and softened. The

cervi was soft. There was some pain in the left adnexal region, and there was a suspicion of a mass in the left side. A tentative diagnosis of tubal pregnancy was made. Operation was refused until the next day when pain and fever had increased. Operation was performed fifty-eight hours after the onset. It was found that the sigmoid was on the right side the ascending colon and ileum and a gangrenous appendix were on the left side. Peritonitis was present. Later examination located the liver on the left side and the heart on the right, a complete visceral transposition. No pregnancy existed. Death occurred in fifteen days from peritonitis.

Wade (4) describes some very unusual necropsy findings. The subject, a colored infant 6 months old died of pneumonia. The appendix, 2.5 cm. long, was found to be congenitally implanted in the inguinal canal. There was no evidence of appendicitis, nor of hernia. It was evident that the testicle, in its descent had carried the appendix with it. The tip of the latter was close above the testicle. The cecum was normally located.

PHYSIOLOGY

A meager knowledge of appendiceal physiology has been augmented by Heile (5) who states that his studies of the function of the appendix show that the musculature of the appendiceal region and of the appendix itself act together to insure effectual peristalsis. The walls of the appendix secrete tryptic and amylolytic ferments. There is also an internal secretion of hormones which stimulates peristalsis when injected into rabbits.

The investigations of Waller and Cole (6) which included the fluoroscopic examination of 27 children convince them that the appendix is a specialized part of the caecum with a definite peristaltic and sphincter action that fecal material normally retained in the appendix from one period of digestion to another, provides bacteria for colonic digestion. In brief that the appendix is a physiological culture tube. Incidentally the frequent occurrence of appendicular involvement revealed by examination of healthy children was surprising. Waller and Cole believe that appendicitis is essentially a lesion of early life.

Gunn and Whitelocke (7) learned from experiments that the removed appendix ceases contracting when placed in ordinary Locke solution, but when placed in oxygenated Locke's solution at body temperature the contractions recur. In appendices removed at operation there are typically present larger contractions with (usually) superimposed smaller contrac-

tions. A removed rabbit's appendix showed similar contractions, very much like those of the appendix *in situ*. They conclude that the contractions of the removed human appendix approximate those of the human appendix *in situ*. The nerve supply of the appendix is splanchnic and pelvic visceral. Appendices removed from children under ten years of age possessed the greatest contractions. A severely inflamed appendix may still show spontaneous movements of not definitely aberrant type.

ETIOLOGY OF APPENDICITIS

The most noteworthy contribution to the etiological investigation of appendicitis is the conclusion of Rosenow (8) that this disease in the absence of foreign body is usually caused by streptococci that these bacteria are located in some distant focus of infection that they simultaneously acquire an elective affinity for the appendix and entrance into the blood stream and are then carried to the appendix. The location and removal of foci of infection is an important measure of appendicitis prophylaxis. The co-existence of appendicitis and throat affections is thus explained. The danger in appendicitis lies in the fact that the anatomy of the appendix favors strangulation and the growth of facultative and strict anaerobes. In a more recent paper (9) on the elective localization of streptococci Rosenow states that 4 strains from appendicitis produced lesions in the appendix in 68 per cent of the 68 rabbits injected which is a marked contrast to an average of 5 per cent of lesions in the appendix in the animals injected with strains isolated from sources other than appendicitis. The localizations of the strains from appendicitis, ulcer of the stomach and cholecystitis as isolated after animal passage resemble one another very closely in cultural and other respects. Those from appendicitis are the least virulent, those from ulcer occupy a middle position and those from cholecystitis are the most virulent. The virulence seems to be one of the factors that determines their place of survival after intravenous injection.

Anderson (10) notes the relationship between appendicitis and tonsillitis. He states that the tonsil is well recognized as a port of entry of many systemic infections, and reports three cases of acute tonsillitis, with apparent subevidence of throat trouble soon followed by indefinite abdominal symptoms. In each instance a gangrenous appendix was found at operation. He summarizes as follows: (1) It is important to bear in mind the liability of appendicitis follow-

ing acute tonsillitis. (2) The appendicular involvement may be only part of a generalized infection; hence the gravity of such cases is out of proportion to the local symptom. (3) Such cases tend to become atypical in their clinical course and after smoldering suddenly develop fulminating symptoms. (4) Chronic tonsillar infections should be kept in view as the possible cause of similar infections of the appendix. (5) At least some degree of local tenderness and rigidity is almost always to be elicited on careful examination of the abdomen in the right iliac region in appendicitis; though in rare cases these signs may be absent.

The investigation of Savini¹¹ have convinced him that minute traumatic lesions of the appendix mucosa are very frequent. They are due to the presence of particles of carbon and iron. If these microscopic ulcer become infected necrotic appendicitis results. It remains aseptically the condition found at operation depends upon the stage of connective tissue repair. All stages of repair may be represented in different portions of the same appendix. He considers the irritation of the lumen to be an variable pathological.

Hughes¹² believes that the initial cause of appendicitis is mechanical a rotation of the appendix about its mesentery and the degree of rotation determining the extent of the attack. This movement is made possible by a movable loaded caecum, a loss of tone in the abdominal muscles. He affirms that a proper amount of exercise would decrease appendicitis.

Battle¹³ reports two cases in which the mucous membrane of removed appendices was deeply pigmented a brownish black. The discoloration was confined to the mucous membrane and evidently extended into the caecum. He had previously reported four similar cases. The patients were all women all of whom had suffered from chronic constipation and had had attacks of appendicitis. The deposit proved on analysis to be iron. Only one patient had taken iron. Battle believes that the rollers which grind the wheat for flour are the source. He found unusual traces of iron in flour but it could not be separated from the flour by a magnet. He concludes that iron particles may be an etiological factor in appendicitis. The sharp bite cause traumatic ulceration of the mucous membrane.

Suzuki¹⁴ made microscopical examination of 108 appendices removed at operation. He concludes that the ova may be found in the lumen mucosa or submucosa of the appendix without producing symptom or anat-

omalous changes. The presence of ova in appendicitis is usually accidental. A true inflammation is provoked when many parasites penetrate the wall of the appendix and the abraded tissue becomes infected in the lumen. It is extremely rare. (4) The source may cause a non-inflammatory painful morbid condition in the appendix accompanied by traumatic destruction of the tissue and hemorrhage a pseudo-appendicitis. Some defects of the appendix wall are art fact but are usually a cleft formed by the parasite.

Sherlock¹⁵ reports three cases of traumatic appendicitis. Case 1 A young man physician received a hard blow in the right side of the abdomen by the pillow handle. Severe pain followed. He ran a typical course of appendicitis and died on the ninth day having received perforation. The autopsy showed peritonitis and a perforated appendix with a contraction in the perforation. There was no history of previous attack. But necropsy revealed evidence of previous pathology. Case 2 A traveling salesman by the derailment of a car was thrown against the back of the seat in front of him. The severe initial pain soon disappeared but returned a few hours later with typical symptom of appendicitis. Operation revealed a perforated gangrenous appendix. There was a history of two preceding attacks. Case 3 A boy aged 12 years was struck in the abdomen by his brother's elbow. He immediately complained of severe abdominal pain which continued with vomiting and the ordinary symptom. A physician was called on the third day. Immediate operation revealed peritonitis a perforated appendix with gangrenous mucous membrane and a calculus. Sherrick¹⁶ quotes the conclusions of Deaver as follows: (1) From personal experience and a study of the literature trauma is never the direct exciting cause in a normal appendix. Acute appendicitis can follow a severe blow upon the abdomen or severe muscular strain but the appendix will present evidence of pre-existing pathology. Acute traumatic appendicitis is most frequent in males due to their more reactive life occurring between the age of 10 and 14. In an appendix previously diseased the liability to an acute attack following injury depends upon the degree of injury and the pathogenicity in the appendix at the time of injury.

The mortality is high due to late diagnosis rapid gangrene and perforation and late operation. (6) When the history suggests traumatic origin a record should be made of the cause of the injury and also of the operative findings.

PATHOLOGY

Stickney (17) reports the case of a woman, aged 39, who had had symptoms of chronic appendicitis for a year. At operation a small clubbed appendix was removed. The clubbed tip was a circumscribed solid tumor without lumen. Examination revealed 5 small myomata in this area. Out of 647 reported cases of tumor of the appendix, only 3 were myomata.

Primary carcinoma of the appendix, although formerly considered an extremely rare pathology, is stated by Meyer (18) to occur in 0.5 per cent of removed appendices. Meyer reports three cases. The diagnosis was made microscopically. Pre-operative diagnosis is impossible, and diagnosis at operation unusual. The condition is histologically malignant, but clinically benign. Nevertheless clinically malignant cases do occur. The tumor occupies the appendix tip with obliteration of the lumen. The growth was noted to be of a yellowish brown color in one case. Ras-leur (19) reports two cases. In the first the yellow color was noted on section and the diagnosis made microscopically. The same color observed on section in the second case, led to macroscopical diagnosis, which was later confirmed by the microscope.

Pseudomucinous cyst is a truly rare lesion. Phemister (20) states that it results from the slow accumulation of an altered secretion of the appendix produced by a mild inflammatory process. Most of the cases have occurred between the ages of 35 and 50. The fluid which accumulates during an acute attack of appendicitis varies from serous to purulent or ichorous. The accumulation either disappears rapidly with the subsidence of the acute inflammation or escapes into the peritoneal cavity through a perforation. Persistence of this fluid with chronic cyst formation is rare. However cases are reported of stenosis of the proximal portion, with pus accumulation in the part beyond leading to the formation of chronic empyema of the appendix. Chronic hydrops following milder attacks in which the appendix is filled with a simple serous exudate is also very rare, because the mucous membrane is preserved in such cases, and its secretion changes the character of the contents so that pseudomucinous cysts usually result. The cause of the stenosis and retention of secretion is uncertain. It is probable that inflammation and involution are associated in varying degrees in the causation. Often there is no history of preceding attacks of appendicitis, and if so they have been mild. The lumen of the

appendix is filled with a transparent, gelatinous material which is usually quite thick. It contains no faeces and usually no bacteria. There are few clinical symptoms and development is slow and painless. Sometimes the first symptom is the appearance of a mass in the right lower quadrant of the abdomen. Phemister reports a case in which the removed appendix was 21 cm. in length and 21 cm. in its greatest circumference. It was filled with a thick, gelatinous material. Portions of the wall were thickened and some of these areas suggested calcified plaques.

Phemister states that pseudomycoma peritonei results from rupture of the cyst. Frankel in 1901 described the first case arising from a perforated colloid cyst of the appendix. About 30 cases have been reported since. Perforation is usually symptomless and the pseudomucinous material is disseminated on the peritoneal surface in various sized masses. There are usually no symptoms subsequent to rupture as the contents are sterile. This condition is cured by removal of the cystic appendix as the source of the material is removed and the remaining portion is absorbed. In a case reported by Ogilvie (21) the patient complained of something solid "tapping him on the inside at the appendiceal region while he followed his daily work. A hard irregular mass was palpable over McBurney's point. A roentgenogram revealed a shadow which might be a calcified cyst of the appendix or a ureteral calculus. At operation a calcified appendix was removed. Examination revealed a pseudomycomatous cyst whose walls were almost entirely calcified. The base of the appendix contained mucoid material while the distal portion was filled with pus.

Pfiffner (22) in a paper on appendicular obliteration states that chronic appendicitis pathologically includes low grade inflammation and end-results of such an inflammation. The latter is evidenced by cicatrices, strictures, kinks, and by destruction and replacement of mucosa by fibrous tissue, with obliteration of the lumen. The latter is not a physiological process. In 100 surgically removed appendices the occurrence of obliteration was most frequent during the age of active inflammation (20 to 30 years) and was not dependent upon the advanced age of the patient. This contention is borne out by a case recently operated upon by the writer. The patient was 70 years of age and the appendiceal mucosa was gangrenous with obliteration of the lumen only at the tip. Pfiffner classifies three types of symptoms due to an obliterated appendix: (1) reflex, due to irritation of the nervous

mechanism of the appendix (2) local due to mesenteric and peritoneal contractions and inflammatory bands and adhesions affecting the appendix or contiguous bowel (3) consecutive symptoms general and local consequent upon disturbed function of the iliocecal region. Simple appendectomy avails for relief symptoms but in local and consecutive symptom only in so far as the operation permanently relieves the symptom producing contractions, sclerosis or adhesions. The determination of these latter conditions and the appropriate treatment therefore awaits further observations and experience.

Another type of obliteration is described by Bonn (12) who reports seven cases of tiliform appendices. A tiliform appendix so named and described by Eastman (14) is a slender white cord usually covered entirely or in part by a pericolic membrane. If only partially covered the unconstricted portion may be of normal size. The end may be free or attached to the parietal peritoneum. The constricted part is without lumen. A tiliform appendix may be mistaken for an adhesion or the appendix may be considered congenitally absent or pathologically destroyed. Bonn believes that two processes are associated in the production of the tiliform appendix, namely, a chronic inflammation and an involution due to constriction by the accompanying pericolic membrane.

Judd (25) reports a case of auto-amputation of the appendix a term used by Murphy (10). Judd's case was a young man with indefinite symptoms of appendicitis. During a kidney operation the appendix was brought into the incision. It was connected with the cecum only by a fine adhesion. Pinching at this point with the fingers entirely separated the appendix from the cecum. There was no opening into the cecum. The proximal end was also closed. The appendix was 7 cm long, not dilated and contained a small amount of mucoid material. It showed the lesions of a chronic interstitial inflammation.

DIAGNOSIS

The diagnostic value of rigidity of the right rectus has been so greatly emphasized according to Randall (1) that many cases of appendicitis have been neglected in the absence of this sign. He states that ordinarily rigidity of the right rectus is a reliable guide, but in some cases rigidity of the right external oblique is present in its stead. These cases are mild, many patients are about and attending to business and a high polymuclear count is the only indication of a

serious condition. In over 60 cases seen the patient was by Randall with rigidity of the right external oblique and not of the right rectus, the appendix was retrocecal and retroileal.

Ten Horn (18) reports that traction upon the right spermatic cord produces pain in appendicitis. This he noted in about 10 cases. The cord is grasped above the testis and gently pulled without making pressure on the testis. He believes the pain to be due to irritation of the peritoneum about the internal ring. He found the value of the cremasteric reflex sign.

Ruthkevitch (19) believes that chronic appendicitis is frequently diagnosed as some functional gastric or intestinal disorder. It is very common. Many patients given history of previous attack of characteristic pain. Examination tenderness at McBurney's point and temperature are either negative. Ruthkevitch could not elicit Rovsing's sign and leukocytes were present only once. He concludes that there are no diagnostic signs of chronic appendicitis. Palpation is the best guide. He palpated the appendix in 60 per cent of cases and pain was produced in 48 per cent. The palpation also caused pain in the upper abdomen at the same time in many cases. His method of palpation is as follows: The flexed fingers of the right hand are pressed down between the external wall of the cecum and the abdominal wall. The fingers are then extended and an endeavor made to deflect the cecum toward the median line. This manipulation invariably produces pain in chronic appendicitis.

Blachoff (20) distends the previously emptied bowel with air through a rectal tube. By this means pain over McBurney's point is elicited in the appendix diseased (Bartoloni's sign). Pain over the appendix as ordinarily observed should not be considered diagnostic of appendicitis as it is caused by other conditions.

Lanz (31) states that frequent and painful urination in children may be an early sign of appendicitis. When the finger is introduced into the right inguinal canal the muscles contract about it if the appendix is inflamed. The cord is painful and tender. Contrary to Ten Horn, Lanz believes that the cremasteric reflex is weak or absent in acute appendicitis.

Sutton (32) reports a case of appendicitis with unusual features in a young unmarried woman. At 5 a.m. he found the patient suffering from intermittent colicky abdominal pain, abdomen tympanic, temperature and pulse normal. No abdominal tenderness. He gave soap-suds enema, liquid diet and castor oil. Diagnosis, acute intestinal indigestion. At 4 p.m. the tempera-

appendicitis by palpation and X ray. This was confirmed by operation and the patient has regained her normal health. Kenebeck says, The irritation or traction spasm originates at some particular attachment of the appendix to a branch of the mesenteric plexus and reaches the musculature of the stomach by way of the mesenteric and celiac plexus as follows: (1) hepatic plexus and plexus gastroduodenalis to the pylorus; (2) plexus gastro-epiploica dextra to the pylorus and lesser curvature; (3) plexus gastroduodenalis to the fundus and region of greater curvature. Afferent impulses in general pass from an inflamed appendix to the mesenteric ganglia, suprarenal ganglia, vagus to medulla and thence independent of the spinal centers.

Aaron (40) previously had noted that pressure over the appendix caused epigastric pain. Recently while examining a case of chronic appendicitis with the fluoroscope he induced a pylorospasm by pressure over the appendix and coincident epigastric distress of which the patient had frequently complained. Aaron believes this reflex pain is caused by pylorospasm and ventures the opinion that the gastric symptoms of appendicitis are also due to this spasm.

Aynesworth (41) states that the average incidence of appendicitis in children up to 15 years of age is 15 per cent. The large number of such cases are due to late diagnosis and rapid development. Cases have been reported as early as the fifth week. Failure to make a diagnosis due to oversight rather than to symptomatology. Unfortunately other acute mild abdominal conditions are common leading to late diagnosis, and children do not readily localize painful areas. The history is scanty. Nevertheless Aynesworth believes that the diagnosis can be made fairly early. Abdominal pain is usually the first symptom. Children with even slight peritoneal involvement protect the abdomen very carefully. The appendix may be anywhere in the abdomen. When it lies in the pelvis there may be no abdominal rigidity and tenderness only deep in the pelvis. In the presence of bladder irritation or doubt of diagnosis a rectal examination should be made. Pain, vomiting, tenderness, rigidity in any part of the abdomen and fever strongly indicate appendicitis. Gastroenteric affections must be excluded. Examination of the lungs should be made in children whenever an acute abdominal condition is presented.

Fleischner (42) reports the following case. A child 8 years of age became acutely ill with

fever, vomiting and pain in the right side of the abdomen. Twelve hours after the onset there was a leucocytosis of 30,000. A tentative diagnosis of appendicitis was made. Upon examination light percussion of the chest revealed relative dullness over the right lower lobe of the lung and on auscultation the breathing was slightly diminished. There was no distention of the abdomen and abdominal respiration was normal. Considerable pain was complained over McBurney point and extending upward but neither tenderness nor rigidity was commensurate with the pain. Operation was postponed for twelve hours. At this time pneumonic symptoms were more evident. In twenty-four hours there was no doubt of pneumonia and pain had disappeared.

Gage (43) states that pain, tenderness, and muscular spasm in the right iliac region occurring during typhoid and render differentiation from appendicitis difficult. The difficulties are increased by the fact that the appendix does share in the intestinal lesions of typhoid as instances by case reports of ruptured typhoid ulcerations of the appendix.

Gage divides the appendicitis of typhoid into 3 classes: (1) appendicitis, an accidental accompaniment of typhoid or chronic condition become active; (2) typhoid ulceration of the appendix; (3) appendicitis occurring soon after typhoid as to be due probably to it. An unusual case of post typhoid appendicitis was reported by Stokes and Arncliffe (44). A young man who had had typhoid 10 years before developed acute appendicitis. The appendix was gangrenous and the bacillus Eberth was cultured from it. The Widal reaction was positive. Was he a carrier? Several cases have been reported of accidental complication of appendicitis without evidences of typhoid involvement but due to mild infection with typhoid bacillus.

Gage reports a case in which acute right iliac pain, rigid rectum and vomiting developed when the typhoid temperature had been normal for five days. The leucocyte count rose rapidly to 18,000. Laparotomy for probable perforation revealed an unruptured gangrenous appendix lying in a walled off abscess. The pathologist reported typhoid ulceration and the presence of typhoid and colon bacilli as well as streptococci. Gage believes that careful examination of removed appendices for so-called accidental inflammation would reveal the presence of typhoid lesions in many cases. He emphasizes the importance of a rising leucocyte count.

Winlow (45) reports 4 cases which were operated on.

ated upon a rather typical symptomatic
appearance. In these the Widal reaction was
negative. Occasionally a few per-
cent of the patients had a positive
serum reaction and the early stage
diagnosis is difficult. Some of the cases
ran through typical phases. Typi-
cal will be represented by a case in which
all of this may be seen. The disease
duration was a month. The
fever recurred after the attack typi-
cally after a few days. The
occurrence of the fever. The
may be seen in the
murmur which is part of the
which is part of the
is a well known
clinical picture
be seen and times in the
rant and the

perat until the lacteum is at
 36° point on a regular basis. A
 lady at 1 year who had malarial
 fever and malaria for 3 years and
 could not take any more at 1 year
 with out nausea & vomiting. Her temper-
 ature 101.4 F pulse 120 rest all
 the time. Then the mother took
 the her temperature was 101.4 F
 with pain and tenderness in the
 abdomen. She had received the
 immunization in the 1st year
 preceding birth. A later
 was made. Ovary removed in April
 which did not do any harm. Her
 temperature continued to be 101.4 F
 and pulse at 120. In December
 the fever in December was not
 in December. With regard to the
 immunization in the 1st year
 and the 2nd year was not
 in January. The patient ran a
 temperature of 101.4 F

When the representative raised the hospital charges, the patient appeared to be not at all disturbed. A number of patients had uttered malaise. They all had diarrhoea and pain in the abdomen. In diarrhoea, the appendix was unaffected by inflammation. The water in the over the appendiceal region with a small amount of the abdominal wall. Nephritis, bacilli were found in the urine. The appendix was removed and the immediate disappearance of symptoms and prompt recovery. The lesion in the appendix were mild but in several cases, cultures of

I have been thinking about you
 and how much I love you.
 I hope you are well and happy.
 I will write again soon.
 Love,
 John

[illegible]

the wind is high and very much
severe at a time. All by a
time in the afternoon. The
wind is very strong and
much extent the storm. The
wind is high and very much
severe at a time. He heard these
whistling with a loud and
a very much and a very much
and a very much

Wale report the case of a girl 22 years of age who was seized with a violent attack of pulmonary tracheitis while at the hospital for the treatment of her nervousness.

but soon recovered. Nausea and vomiting were followed by relief. There was slight tenderness in the lower right quadrant. At operation, upon delivery of the appendix, the partially anesthetized patient strained causing the apparently normal appendix to inflate alarmingly. Pressure was required to accomplish deflation. The appendix contained a No. 6 hard shot. There were no inflammatory changes. Waller believes that this case accounts for hitherto puzzling attacks of acute colic in which the appendix was not pathological but contained small concretions or foreign bodies, these concretions or bodies acting as a ball valve preventing ready deflation and producing symptoms of colic.

Strauss (55) reports five cases of extraperitoneal appendicitis which he classifies under three heads: (1) Those presenting a straightforward picture of appendicitis. In these cases the appendix cannot be found until the peritoneum is incised near the cecum and the latter lifted up. (2) Those simulating a perinephritic abscess. This type is characterized by pain, tenderness, and swelling in the right lumbar region. Through the lumbar drainage incision it may be possible to remove the appendix without entering the peritoneum. (3) If the appendix is not removed a persistent fecal fistula may result. Fœtid pus obtained from a lumbar abscess is probably due to disease of an extraperitoneal appendix. Careful search should be made before deciding that the appendix is absent or has sloughed away.

Lichty (56) who reports about 700 cases of appendicitis from the view point of the internist, is impressed with the fact that many cases of supposedly chronic appendicitis are operated upon without relief of symptoms. He summarizes as follows: (1) A close co-operation of physician and surgeon is necessary to obtain the best results. (2) Since only 8 patients out of about 700 under all conditions and circumstances, died the disease need not be considered with such alarm. (Lichty refers to cases hurriedly diagnosed and operated upon for chronic appendicitis in which there may be no pathology in the appendix.) (3) An early operation during the first acute attack is not only safest but will likely prevent a life of more or less chronic invalidism. (4) A careful routine study of the leucocytes in acute appendicitis is of diagnostic value. (5) A routine study of the gastric secretion in chronic appendicitis yields valuable information (hyperchlorhydria). (6) The end-results in cases of chronic appendicitis are often unsatisfactory and cannot be definitely foretold.

TREATMENT

Guthrie (57) reports the use of the serum and vaccine of colon bacillus in 22 cases of appendicitis. All recovered without operation. There was one recurrence here too little of the serum was used and no vaccine. The relief from pain was striking. Serum should be used before pain becomes localized. He gives 50 ccm. of the serum and a few days later 100,000,000 colon bacillus vaccine to prevent recurrence. The fixation of complement test should be made and if some other organism is the determining cause a corresponding serum or vaccine is indicated.

Syms (58) reports a mortality of 100 per cent in a series of peritonitis cases of appendiceal origin in 1904. The mortality of a series in 1912 was 16 per cent. Improved operative methods have decreased the death-rate. Syms agrees with Murphy that peritoneal peritonitis tends to be localized or general from the very start, depending upon the kind of bacterium responsible and the patient's resistive power. He disagrees with Stanton (59) in his conclusion that dissemination of peritoneal infection is largely a matter of peristalsis and that the quiet afforded by withholding food and water by mouth will prevent its spread. Syms believes in immediate operation at any stage of appendicitis. If infection is present a rapid, simple operation with drainage is indicated the drains being placed between the intestines and the parietal peritoneum. The after treatment consists in washing the stomach if there is nausea, vomiting or extreme sepsis and withholding food and water per mouth for 4 to 48 hours, keeping the patient in the Fowler position, use of the Murphy drip clear by the lower bowel by enemata to relieve distention, no cathartics, few drugs, no opium stimulation if necessary. If the pulse or heart is weak the Fowler position should not be used. Post-operative ileus is due to spreading peritonitis, septic infection, excessive manipulation at the time of operation, faulty placing of drains, failure to empty the lower bowel before distention, and the use of morphine or opium.

The principles of the Ochsner method as outlined by Hicks (60) are as follows: The medical treatment, if it can be called such, consists in the prohibition of food, physac and generally of water, lavage at times, rest in bed, mild heat applied locally. All cases seen in the first 24 hours are operated upon at once if willing, a few are operated upon on the third day but cases from the fourth to ninth days, especially if

very ill are treated medically until a safer time for operation.

Deaver and Pfeiffer (61) agree with Ochsner in their statement that early operation in appendicular peritonitis is the rule but is of no benefit and may be harmful in cases of more than 40 hours duration with signs of diffuse peritonitis and marked systemic toxemia. Removal of the appendix is of no avail as that organ is buried in a mass of omentum and coils of intestines and is incapable of adding to the infection. Spreading peritonitis cannot be checked by surgical means. The best treatment is supplying rest to the alimentary tract by withholding everything by mouth. The Fowler position and enterocolysis are important. When the outlying inflammation subsides and localizes about the appendix the latter may be removed or the pus which is about it. The after treatment consists in the sitting posture, enterocolysis, nothing by mouth and careful nursing.

ANÆSTHETIC

In a consideration of choice of an anæsthetic Bevan (62) states that drop ether should be chosen today as the standard general anæsthetic when a prolonged anæsthesia is desired with relaxation and unconsciousness. Gas should be chosen in short anæsthesias and in special cases such as kidney insufficiency. Local infiltration anæsthesia may be used when the surgeon has the full co-operation of the patient and when the field of operation can be completely infiltrated and anesthetized by a safe amount of novocaine and epinephrin. He believes that nerve blocking should as a rule be confined to nerves which are exposed by a dissection done under local infiltration as in a herniotomy.

Harris (63) reports 34 appendectomies done under nerve blocking. The appendix is insensitive but novocaine must be injected at the base of the meso-appendix. The method is safe and free from the dangerous sequella of general anæsthesia. The psychic element has been overestimated. Dread of operation is based upon fear of pain which may be abolished by assurance that there will be none upon loss of consciousness which does not obtain with local anæsthesia and upon fear of the outcome. This fear may be mitigated somewhat by the fact that patients are apt to consider an operation which can be done with local anæsthesia as less severe than one requiring a general anæsthetic. Nerve blocking teaches the surgeon to employ gentle manipulations which tends to decrease shock.

Brun (64) says. The writer confesses that

after many attempts some of them dating back a long time he always returns to the same conclusion that is to perform operations on the appendix under general anæsthesia without local anæsthesia.

INCISION

Our views in regard to the most desirable incision for appendix removal have recently been modified. Brickner (65) states that the McBurney incision is satisfactory for a simple appendectomy but a presumably simple appendectomy may resolve itself into a more extensive operation requiring liberal exposure. The incision is not suitable for exploration of the upper abdomen so often indicated nor does it lend itself to enlargement. Its routine use would lead to otherwise avoidable technical difficulties and conditions might be overlooked which would be observable through the right rectus incision.

Harrigan (66) describes a modified McBurney incision for the treatment of appendicitis and pelvic disease as follows: 1) After removal of the appendix the peritoneum and internal oblique and transversalis muscles are sutured. (2) The skin incision is extended downward and inward toward the median line. (3) The aponeurosis of the external oblique is divided to the point where it fuses strongly with the anterior rectus sheath. (4) The anterior rectus sheath is incised parallel to the line of fusion of the external oblique muscle leaving a sufficient margin internally to suture. (5) The rectus muscle is freed, displaced and retracted outward. (6) The peritoneum is incised.

Rockey (67) describes the transverse incision as follows. The skin incision 2 to 2½ inches long is made directly transverse with its center at or near McBurney's point. The outer part of the rectus sheath is incised dividing the tendinous border and the aponeurosis of the muscles on a directly transverse line. The scalpel handle is inserted below and the finger above and the wound pulled wide apart without cutting any muscle fibers. The external oblique fibers are retracted at the outer angle and the rectus at the inner angle. The peritoneum is divided transversely. Definite pre-operative diagnosis is essential as this incision is not adapted to other pathological conditions. In interval cases and acute cases before rupture the operation is facilitated and firm union obtained. In pus cases it gives direct approach. Drainage is placed in the outer angle of the incision and the outer side of the cæcum. Rockey believes that liability to hernia is diminished.

OPERATIVE TECHNIQUE

Torek (68) has described a combined incision for appendectomy and right herniotomy. The skin incision usually employed in herniotomy is prolonged outward and the appendix is removed through a muscle splitting incision beyond the internal ring.

An interesting variation of operative technique is described by DeTarnowsky (69). He advocates the routine removal of the appendix through the internal inguinal ring during right herniotomy. His results have been satisfactory in over 50 cases. The cecum is distant only 4 to 6 cm from the internal ring and can be partially or totally delivered. If the ring admits two fingers or can be easily stretched to admit them he delivers the cecum with the index and middle fingers. A freely movable appendix may be delivered with the index finger alone. Gross pathology was evident in 30 per cent of the appendices thus removed. He does not advise this route in acute appendicitis.

Neill (70) describes Cullen's method of exposing a retrocecal and densely adherent appendix. The base of the appendix can usually be located. When this is accomplished blunt forceps are pushed through the meso-appendix at this point and a tape drawn through. Traction upon the ends of the tape brings up from three fourths to one inch more of the appendix. Another tape is inserted as before and this maneuver repeated until the appendix tip is delivered. Usually three tapes are sufficient. The meso-appendix is clamped off and the remainder of the operation carried out according to indications.

White (71) reports a case of appendicitis, drained with a rubber tube in which an active hemorrhage began four days after operation and continued twenty four hours although packing was tightly inserted about the tube. He believes that the hemorrhage was produced by erosion of the deep epigastric artery by the drainage tube. Fatal hemorrhage has occurred from this source. The artery is frequently exposed with its companion veins, in the incision. White applies two ligatures about one inch apart to these vessels in the lower angle of the incision. Free anastomosis insures adequate blood supply. He believes that ligation should be routine in this class of cases.

Petitt (72) describes a method of drainage through the McBurney incision. The drainage tubes lie close to the ilium at the outer end of the split in the internal oblique and transversalis. These muscles are then sutured to the tubes. A

slit is made in the external oblique close to the ilium and the tubes are drawn through. Finally they are brought out through a corresponding small skin incision close to the anterior superior spine. The drainage canal is thus placed between the cecum and the bony wall of the pelvis. Primary union of the operative incision is facilitated.

Benjamin (73) deprecates the practice of leaving the raw appendix stump uncovered as adhesions are invited. Nature must cover it over with tissue exudate.

Carter (74) describes his method of disposing of the appendix stump as follows. The appendix is clamped near the base and cut off. The suture is threaded on a round needle. The needle is inserted into the cecum about one-fourth inch from the stump and emerges about one-fourth inch beyond parallel with the base of the appendix. Repeating this maneuver twice more surrounds the stump with a triangular stitch. An assistant enters the stump into the bowel and the suture is tied. A few reinforcing Lembert sutures may be inserted.

The Mayo (75) appendixomy so beautifully demonstrated by the teretoculic of Kelly is probably the best known method. The writer expresses continued confidence in a procedure which he has previously described.

COMPLICATIONS

As a complication of appendicitis, Delatour (77) reports seven cases of pelvic abscess following the Fowler position. The patient does well for a time although there is persistent slight elevation of temperature. The incision has ceased to drain and the patient may be allowed to go home with a temperature slightly above normal. Others suddenly recover. Delatour believes that all these cases have undetected pelvic abscesses of comparatively slight virulence. Sudden recovery is due to rupture of the abscess into the rectum. In this series the abscess was disclosed by rectal examination. Treatment consisted in incision per rectum unless the abscess was located high up in which event it was aspirated.

Babler (78) believes that pyelophlebitis with multiple abscesses of the lung or liver is a more frequent complication of appendicitis than is realized. In a typical case the diagnosis rests on (1) the history showing that the appendix was the primary seat of trouble (2) the shifting of the symptoms from the appendix to the hepatic region (3) the progressive increase in the severity and character of the symptoms (4) the

repeated chills followed by high pulse rate and marked elevation of body temperature (1) the jaundice (2) the persistent pain in the hepatic region (3) the urinary and blood findings (4) the change of liver dullness (5) the picture of marked toxæmia and (6) the absence of the signs and manifestations of extensive peritonitis. Multiple abscess of the lung is indicated by repeated chill, septic temperature and persistent cough. The only hope of relief lies in locating and draining the abscesses. Haller reports three cases (1) were abscesses in the liver one of the lung. All were fatal.

Markoe (19) quotes Deaver as follows: "The earlier the operation for appendicitis during pregnancy the less the likelihood of infection of the right tube and ovaries and the less likelihood therefore the development of serious complications. I have never had abortion occur in pregnant women upon whom I have operated for acute appendicitis unless the right uterine appendages are involved in the disease and seldom then." Markoe believes that abortion in these cases is caused by undue handling of the uterus and incision. He reports two cases. Case 1. Age 23. 1 para. had had acute pain in the appendiceal region for some time. Examination revealed a five month pregnancy, there was acute pain a little above McBurney point and some rigidity of the right rectus. Incision was made at McBurney point. The appendix was not adherent to the ascending colon. The greatest care was taken that the uterus, fall pian tube and ovary were not injured or manipulated, they being held to one side with a pair of wet cotton forceps. The appendix was removed. The patient made an uneventful recovery and four months later was delivered at full term. Case 2. The patient was suffering several days with marked rigidity, temperature 101 F, a white cell count of 16,000 and polyuria. Immediate operation was advised and the advice accepted. A median incision was made from the umbilicus to the symphysis. The omentum extended down over the right tube and ovary, being firmly adherent to the uterus. The omentum was tied off, then the appendix which was embedded in this mass was tied off and the stump buried. This left a mass consisting of a piece of omentum, right tube, ovary and appendix attached to the uterus and right broad ligament. The right tube was very gently tied off and cut away and the adhesions which held the appendix, omentum and ovary were then removed from the uterus. Stal wound drainage was provided. The patient aborted with a 4.5

month fetus within twelve hours of operation. Otherwise her recovery was uneventful. Markoe states that the appendix is not drawn up into the abdominal cavity by pregnancy, but on the contrary may be brought up with difficulty into the incision.

Wallace (81) reports a case of ruptured appendix at full term pregnancy as follows: "The patient called him at night for supposed labor pains. He found her sitting up and complaining of severe pain low down on the right side. There was slight cervical dilatation. The head was not engaged. The next afternoon she was still in pain and had become continuously. Temperature 103.6 F, pulse 118. Vaginal examination revealed no increase in dilatation but sign of abscess in the appendiceal region. An ice cap was applied in the hope that peritonitis could be delayed until after delivery. The next day the temperature was 104 F, pulse 140. Appendectomy was performed and the abscess drained. The incision was closed with exceptional care about the drains in order to withstand the severe strain of labor. Closure was difficult and he believed would have been impossible had he not incised the fascia transversely. The next day, after one and one half hours of labor, a normal delivery was accomplished under anesthesia. Recovery was uneventful. The dilatation of McBurney point in the pregnant abdomen was noticeable. It is difficult to determine where to make the incision."

QUESTIONS

Bunts (82) reports an interesting sequelæ of appendectomy. The patient was a nurse who had had a clean appendectomy performed several years previously. She was free from discomfort for nearly a year after operation when she again complained of pain in the right side. The attacks were very severe. Examination revealed a somewhat enlarged ovary. At operation the right ovary was found slightly enlarged and cystic. At the site of the former purse-string suture on the cæcum was a white ring which formed the base of a conical projection of the bowel about one inch in length. Fearing the possibility of rupture of the thin-walled liver-uticulus and that distention it might cause volvulus Bunts invaginated the protrusion into the cæcum and secured it with a double purse-string suture. There has been no recurrence of pain. He has since found the same condition in two other cases, but in lesser degree. In all three cases the right ovary was abnormal and might have been counted for the pair of which they all

complained. He believes the condition to be not uncommon and that future observation will prove it to be responsible for recurring pain in the right side after appendectomy.

Case (83) states that a common cause of cecal stasis is adhesions, usually associated with disease of the appendix. Immediately following recovery from appendectomy there is usually considerable cecal stasis. Following the attempt to expel the barium enema, it is seen that the cecum has failed to contract, the peristaltic waves which evacuate the large bowel commencing at or above the ileocecal junction instead of at the tip of the cecum. Even several years after operation cecal stasis persists in many cases, a round residue of barium the size of a 25-cent piece remaining in the cecum after the colon is otherwise emptied of barium. This is especially likely to occur where the patient complains of a tenderness of the cecum. Sometimes this cecal stasis was present before the operation, but often exists after operation where it did not exist before. He believes that the rounded barium occurs at the site of the stump of the appendix and that it has some relation to the invaginating suture by which the stump is buried. This suggests the desirability of including the least possible amount of cecal muscularis in the suture.

In a series of 276 cases of intestinal obstruction reviewed by McGlannan (84) 63 were post-operative. Nearly 40 per cent of the post-operative obstructions and 10 per cent of all cases in this series followed drainage operations for appendicitis. This is a potent argument in favor of early operation at a time when no drainage is required. Had these patients been operated upon early all would have been spared a second operation as a result of which 9 died. Prompt operation in appendicitis and careful covering of surfaces in all abdominal operations will afford efficient prophylaxis against post-operative obstruction.

In a series of cases of acute intestinal obstruction reported by Deaver and Ross (85) 81 were due to post-operative adhesions. Fifty-one cases followed operations for appendicitis and 44 were drained at the original operation. 27 died.

PROGNOSIS

The prognostic value of post-operative leucocyte count is discussed by White (86). He states that a secondary peritoneal infection with good resistance shows an early and marked increase of leucocytes and will continue for some time. The leucocyte count is a safe guide as to conditions within the abdomen. In general

peritonitis a constant low or declining leucocytosis denotes a grave prognosis.

Elsner (87) believes that an unusual amount of urobilinogen in the urine during appendicitis indicates a destructive lesion of the appendix.

MORTALITY

Turner (88) states that the mortality of appendicitis should be less than 5 per cent. Early operation would decrease the death-rate to 1 or 2 per cent, or it might become practically nil. Appendicitis is not inherently dangerous. The result is a question of degree of peritonitis and the stage of the disease when operated upon. At present over 60 per cent of cases are operated upon when involvement is localized. Ten years ago conditions were reversed.

Kakela (89) believes that the majority of deaths from appendicitis are due to failure in making a diagnosis, the abdominal pain being assigned to other abdominal organs rather than the appendix. Early diagnosis should be easy if we remember the following train of symptoms: sudden generalized abdominal pain, gradually becoming localized nausea and vomiting, general abdominal sensitiveness, local rigidity, elevation of temperature, leucocytosis and rapid pulse.

Murphy (90) makes the startling statement that the mortality of appendicitis in the hospitals of the United States is 10 per cent. This death rate is due to procrastination. The early symptoms are usually diagnostic later they are obscure. Early symptoms are no guide to the probable outcome. Pain and temperature may be gone by the second day which may mean resolution or gangrene. A gangrenous appendix produces neither pain nor leucocytosis. The next symptoms are those of general peritonitis. The mortality in childhood is three or four times as high.

CONCLUSIONS

1. The incidence of primary carcinoma of the appendix suggests the advisability of routine appendectomy during laparotomy.

2. Infection of the appendix by bacteria carried through the blood stream from a distant focus is an established fact.

3. Typhoid fever and pneumonia in their early stages may be difficult to differentiate from acute appendicitis.

4. The chief symptoms of chronic appendicitis may be referred to the epigastrium.

5. Undue retention of barium in the appendix and tenderness of that organ elicited under visualized palpation are roentgen signs of great diagnostic value.

6 Appendicular bliteration an end result of inflammatory changes and is self-productive of symptoms

Excepting the frank case of a cecal appendix diagnosis uncertainty or coincident pathology demand ample incision hence the right rectus approach.

8 The mortality of appendicitis is too high. Early diagnosis and early operation are essential to low mortality.

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ABSTRACTS OF CURRENT LITERATURE

GENERAL SURGERY

SURGICAL TECHNIQUE

OPERATIVE SURGERY AND TECHNIQUE

Primrose A. The Physics of a Surgical Dressing with Special Reference to the Harmful Effect of Using Impermeable Material Over Septic Wounds. *B. M. J.* 1916, 1, 215

The author refers to an article by Sir Muroth Wright in which Wright advocates the use of sodium chlorid 5 per cent with sodium citric 0.5 per cent as a solution for moist dressings, these being covered by an impermeable ring. The author objects to the use of an impermeable ring over moist dressing, where drainage is desired. He cites experiments to show that capillary attraction is lessened or made nil when evaporation is a part of the dressing prevented. The experiments were carried out by using disks containing water, a gauze wick being saturated and placed therein with one end protruding. A crystal of an aniline dye was then placed in the wick. If the flask was uncovered the dye rose in the wick, whereas if an impermeable substance was placed over the flask the dye did not rise. This objection to Wright's recommendation says the author is especially tenable where the wound is an infected one where drainage is greatly to be desired. *111 SKINS*

Fisher H. E. Non-adhering Surgical Gauze. *J. Am. M. A.* 1916, 1, 439

Fisher has experimented with various materials in the dressing of open wounds. Absorbent cotton, chamois, skin and powders, he rejects as unsatisfactory. Cutta percha and silver foil if perforated gave fairly good results. Plain surgical gauze is satisfactory, except that it adheres to granulating wound is a disadvantage which is less troublesome if narrow mesh gauze is used. Medicated gauze he found to have no particular advantage over plain gauze.

He secured the best results from the use of gauze impregnated with paraffin in the following manner: Eight parts of paraffin mixed with two parts of white petrolatum and lanolin is boiled for ten minutes. Then dry sterilized gauze in strips is immersed for ten minutes in the mixture. The gauze is gradually removed and stretched and allowed to dry in a current of filtered air, which frees the apertures of excess paraffin. In use one layer or two is placed in direct contact with the wound or raw

surface. In ordinary surgical gauze fluid is placed above it. The gauze can be changed as frequently as desired. In the waxed gauze can be left on for a considerable period. The advantage is it is lifted off.

The author finds that this method of dressing has the following advantages: (1) It does not adhere to a granulating wound and can be left on for a considerable period. (2) It causes no pain or discomfort on application or removal. (3) The paraffin is not absorbent and the gauze does not become matted with secretions and debris. (4) It loosely conforms to the surface to which it is applied. (5) It allows a adequate drainage of the wound secretions through the meshes. (6) It is easily and quickly sterilized by immersion in absolute grain alcohol. (7) It is of particular value in the treatment of skin grafts.

ALBERT EHRHARDT

ASEPTIC AND ANTISEPTIC SURGERY

Fraser J. and Bates, H. J. The Surgical and Antiseptic Value of Hypochlorous Acid (Eusol). *B. M. J.* 1916, 1, 21

The method of preparation of eusol is as follows: In a quart bottle 27 gm. of dry bleaching powder are placed, 1 liter of water added to this and the mixture shaken. Then 27 gm. of boric acid are added and the bottle filled with water after standing for a few hours the mixture is filtered. The filtrate is eusol and contains about 0.5 per cent hypochlorous acid.

Gunshot or stab wounds packed with gauze soaked in eusol solution show beginning granulations within 36 hours. The objections made to the use of this solution are the pain it causes, the irritated and soiled condition of the surrounding skin and the arrest of wound secretion. According to the authors, all of these objections are negligible.

The solution has been used with unmistakable benefit in gas gangrene and in compound fractures complicated by infection. In disintegration of joints in compound fractures of the skull in empyema and after inflammation or wounds of the abdominal cavity, eusol has been of benefit in preventing suppuration and arresting infection. A number of cases of acute toxemia subsequent to wound infection with a gas producing organism have been treated by intravenous injection of eusol in amounts

varying from 4 to 70 ccm. to which was added sodium chloride in the proportion of 0.85 per cent. With this method of treatment most gratifying results have been obtained. E. K. ANASTOMO.

Clinical Report on the Application of Eusol; Report to Medical Research Committee. *Lancet* Lond 916, ccc, 356.

The Medical Research Committee of the Royal College of Surgery of Edinburgh has presented a very interesting report on the use of eusol in the treatment of wounds. Several cases are cited to illustrate the use of the solution in both aseptic and septic wounds and to illustrate its value in serous and synovial cavities and in inflammatory lesions of various types. They advocate its usefulness in wounds which have become septic after certain operations.

Their general conclusions are that eusol in a great variety of cases has proved to be non-toxic and non-irritating, as well as an efficient antiseptic. The action of eusol depends upon the free hypochlorous acid which is liberated by the eusol. There is also a sufficient quantity of borate of calcium to give the solution a slightly alkaline reaction. This feebly alkaline solution can be introduced into wounds or serous cavities with perfect safety. It can even be left in such cavities in quantity without any harmful effect. In lacerated and contused wounds, and in compound fractures, such as are met with in military practice, the committee found it to be the most efficient antiseptic.

It is most efficacious during the period of what might be termed progressive sepsis. Some surgeons have emphasized the benefit of modifying the treatment when sepsis is subsiding or has ceased. The granulations form after a period of two to three days and rapidly cover the surface of the wound. Any tendency to superabundant growth of granulations and consequent delay in healing can be counteracted either by so applying the eusol that the serous discharge is reduced to a minimum and the wound kept dry or by discontinuing eusol and using other dressings appropriate for healing wounds. In any event the sepsis is by this stage completely under control.

The freedom which can be exercised in the application of eusol, and the rapid action which it has in arresting the sepsis and discharge of an infected wound, led to experiments on the effect of eusol on the blood. Following this, eusol was employed in the treatment of general sepsis toxemia by intravenous injection.

This method was first made use of by Lorrain Smith Ritchie and Riddle in a case of grave puerperal septicemia, and the result was the recovery of the patient. They have also applied the treatment in other similar conditions. In several cases toxemia has been successfully overcome, and although such a result has not been uniformly attained, the safety of the method justifies its being applied in the diseases referred to in their pre-

liminary communication. Intravenous injection has also been applied with success by Captain Fraser and Captain Bates in cases of cut toxemia secondary to gas gangrene.

Further research is now being carried out on the development of the subject foreshadowed by these investigations.

The lotion is exceedingly inexpensive. The ingredients are procurable anywhere at a slight cost, and the preparation is a very simple process. Eusol powder is composed of equal weights of boric acid and bleaching powder. The boric acid is in sufficient excess to set free the hypochlorous acid in the solution. The bleaching powder should be dry and should contain 28 to 30 per cent available chlorine.

The solution of eusol is prepared as follows: Add to 1 liter of water 5 grams of the powder, shake well and allow it to stand 24 hours, then filter. The clear solution is eusol, and contains about 0.5 per cent hydrochlorous acid. If the bleaching powder is old or not pure, the strength given above will require a larger quantity of the powder.

A rough and ready method of preparation is to add one half ounce of the mixed powder to a pint of water, stir or shake and allow the sediment to settle. D. C. B. x

ANÆSTHETICS

Jackson, D. E. Some Observations on Anæsthesia and Analgesia. *J. Pharm. Med.* 1 p. Th. p. 96 viii, 3.

Jackson calls attention to the fact that for a number of years past nitrous oxide has been constantly growing in use as a general anæsthetic and analgesic. It has been made possible, in his view, by the introduction of improved methods of administration. The duration of the anesthesia under nitrous oxide has also progressively increased from an average of only minutes or less up to an average of perhaps ten minutes or longer, and Jackson states that he has been able by improved method to keep dogs anesthetized for periods up to five and one-half hours. Quite recently he states there has been a slight tendency to avoid the use of nitrous oxide in any prolonged operation (half hour or more) because it has frequently appeared that the after-effects of prolonged nitrous-oxide anesthesia were more deleterious than those of ether. He believes that this is mainly due to the use of improper and unscientific methods of administering the nitrous oxide. He maintains that the cost of nitrous oxide by the method which he has made use of may be reduced to about 30 or 35 cents per hour for the human subject.

GEORGE L. BELL

Walter W. An Apparatus for the Administration of Gas-Oxygen. *N. Y. M. J.* 90, ccl 352.

A new apparatus is offered which combines simplicity, portability, efficiency and freedom from pres-

sure addition of humidity a curacy the washing of gases the warming of gases visual evidence of the ratio between the gases and a provision for re-breathing with or without either sequence and with out the removal of the mask. The gases are passed through warmed water by means of respective tubes and the evidence of the quantity of gas is shown by the levels of the water in these tubes. A table of ratios is placed in view between the gas-tubes and for any given volume of nitrous oxide as evidenced by the level the desired percentage of oxygen for that particular level may be read and instantly provided by readjustment of the oxygen valve. The apparatus is illustrated and the technique of its application fully described in the original article.

E. K. ARMSTRONG

Aikins, W. H. B.: The Advantages and Risks of Combined Local and General Anesthesia
Can. J. Path. & Clin. Med. 1913 11 37

The author limits his discussion of the use of combined local and general anesthetics to operations about the nose and throat. Hewitt's tabulation of advantages claimed for such a combination are:

- 1 The elimination of the element of fear to which a certain number of anesthetized patients are due.
- 2 The production of a somnolent or apathetic condition which facilitates anesthesia.
- 3 The absence of excitement during anesthetization.
- 4 A diminution of the amount of the general anesthetic necessary to produce the necessary relaxation and depth of anesthesia.
- 5 The diminution of secretion especially that of mucus under ether.
- 6 Lessening of the tendency to vomiting and pulmonary complications.
- 7 Lessening of the tendency to shock.
- 8 A longer period of insensibility after the end of the operation reducing the discomfort and pain.

Adrenalin and cocaine the only local anesthetics considered in this article must be used with great care and discrimination. They should be applied at least one hour before the induction of general anesthesia.

Many authors are quoted who have observed sudden death follow the injection of cocaine adrenalin solutions during a chloroform anesthesia. Dr. Goodman Levy has been able to produce ventricular fibrillation in cats almost at will by injections of adrenalin during chloroform anesthesia a phenomenon which has not followed ether anesthesia. Whether or not the disturbances noted are due to rapid absorption of adrenalin from the sub-mucous tissues or to direct injection into a vein has yet to be determined. But the undoubted risk of using cocaine and adrenalin in combination with general anesthesia induced either completely or in part by chloroform has been definitely proved. The author concludes with an emphatic protest

against such a combination of local with general anesthesia.

E. F. CURT

Hanes, G. J.: Spinal Anesthesia *Lancet* 1913 11 130

The author bases his discussion upon 26 real cases which he has observed. He claims that the advantages of spinal anesthesia over all other methods are that it causes the most perfect relaxation of the parts which it is possible to obtain and that the patient has less post-operative discomfort. In the discussion of the technique the usual points are emphasized: the proper type of needle (short sharp point) an all glass syringe the proper point for injection the upright position of the patient and the proper strength of solution. He has used novocaine in all his cases (one half to one and one half grain solutions being the dose employed).

The operations were for hemorrhoids, tubular structures, polyp, ulceration, ne colostomy and three aneura. The colostomy case was not sufficiently anesthetized with one half grain novocaine to permit the operation to be completed without the addition of ether. One patient who was operated upon because of a great deal of pain in the rectum was given one and one-half grains of novocaine. Although kept in the upright position within five minutes respiration had ceased and no evidence of circulation could be observed. Under various stimulants the patient again had good pulse and respiration but he died within twenty-four hours without regaining consciousness. Post mortem examination showed marked disease of all the vital organs which should have been sufficient reason for prohibiting any form of operation. With these two exceptions the author's experience with spinal anesthesia was completely successful and he is convinced of its superiority in rectal operations.

E. FUSCH

Lewis, B. and Bartels, L.: Caudal Anesthesia in Genito-urinary Surgery *Surg. Gynec. Obst.* 1913 11 263

This is the method of anesthesia proposed and first used by Laeven and is based on the use of saline injections into the sacral canal suggested by Cathlin in 1901. It is a nerve blocking method of local anesthesia applied in the sacral canal using a combination of novocaine potassium sulphate and adrenalin as the local sedative fluid. At the time of the making up of the report the authors had used the method in 85 cases and with such success that they felt justified in making the report.

This method is to be distinguished from that of spinal anesthesia in that the solution is not injected into the spinal canal. The spinal canal is separated from the sacral canal by the cuff of dura mater which closes down on the cauda at about the first segment of the sacrum. An injection of fluid therefore into the sacral canal does not reach up into the spinal canal. The object of the injection serves to obtund the sensibility or anesthetize

the nerves issuing from the anterior sacral foramina that form the sacral plexus. One of the most important nerves of this plexus is the pudic, distributed to the bladder and prostate and other genito-urinary organs. By anesthetizing this nerve an anesthetic condition of the organs mentioned is secured.

Directions for preparing the solution are given and the authors' experience with dosage is detailed. It was found preferable to use larger quantities of weaker solution rather than small quantities of stronger solution to obtain the anesthetic effect. It was found that the pressure-effect of the anesthetic fluid was strongly influential in securing success. From 50 to 90 ccm. of the fluid is now being used by the authors.

The method is particularly advantageous in the very debilitated decrepit, and aged patients who require major work in genito-urinary surgery. Prostatectomies done suprapubically, removal of vesical stones, and cystoscopies in hypersensitive individuals, have all been done with marked success and comfort under this method of anesthesia.

The technique of the administration is described and illustrated in the original article. Measures for preventing untoward effects, such as introducing the needle into the spinal canal or into veins, are

described and suggestions given for avoiding such effects.

SURGICAL INSTRUMENTS AND APPARATUS

Bergeson, J. Z. *PILL Compression Forceps for Controlling Hemorrhage Following Tonsillectomy* *J. Am. M. A.* 9 6 14 55

The forceps devised by the author for compression of the pillars after tonsil enucleation, consist of (1) a handle, (2) a lock, (3) a goose neck shank, and (4) compression tips. A compound forceps which has a straight shank is also described but the two are to be used together. The curved forceps to be applied above and the straight forceps below. The curved forceps are so constructed that the handle lays outside of the mouth, sufficiently to the side to permit work on the other tonsil or the adenoids while the compression continues.

The point of chief importance in applying the forceps is to pass the compression tips to a sufficient distance toward the larynx and all of the throat so as to include in the bit (1) that portion of the posterior pillar next to the constrictor of the pharynx, (2) the floor of the tonsillar fossa and (3) that portion of the anterior pillar next to the insertion of the hyoid. OTTO M. ROY

SURGERY OF THE HEAD AND NECK

HEAD

Gray H. M. W. *Observations on Gunshot Wounds of the Head* *Brit. M. J.* 9 6 1, 16

The principles in the treatment of these wounds as deduced by Gray are as follows: (1) Infected gunshot wounds of the skull and brain require more careful consideration and prompt attention than similar wounds of any other part. (2) Septic can best be combated and prevented by early and complete operations. (3) Permanent disability can be prevented in most cases by the systematic removal of foreign material or displaced bone from the surface or substance of the brain whenever these are accessible to legitimate surgery. (4) By these precautions the immediate results in the saving of life and more rapid restoration of function, when possible, are better than those obtainable by more conservative procedures.

The presence of any foreign body in the brain may not cause immediate disability but sooner or later the brain is very apt to resent the presence of these bodies and untoward symptoms develop. Fragments of bone, clothing, metal, etc., should therefore be removed as soon as possible after the receipt of the injury. The presence or absence of cerebral or cerebellar symptoms should not in the average case, deter the operator from the radical treatment of these wounds.

In minor injuries the lacerated scalp should be excised and sutured. Primary union usually results.

In depressed fractures of the inner table contusion of the brain is almost certain to occur. The dura should be opened in all such cases even when it is apparently normal otherwise injuries to the brain substance may be overlooked and scar tissue forms which may cause future trouble. Furthermore the injured brain substance if allowed to remain untouched may become infected and cause abscess, encephalitis, meningitis. When wounds of the blood sinuses are present it is thought advisable to remove depressed fragments of bone for two reasons: (1) Their retention may cause obstruction to the return of blood from some part of the brain or (2) may lead to septic thrombosis.

As to drainage of the brain, as a general rule this should be avoided whenever possible. The presence of definite pus, infected blood-clot or inaccessible definitely infected foreign bodies, or profuse oozing would indicate drainage. Bacteriological examination of removed substances should be made and if streptococci are found the drainage should be maintained until these disappear from the discharges or become very few in number.

Several points are enumerated by the author: (1) There may be multiple injuries, therefore the whole scalp should be shaved. (2) The force causing the injury usually results in local injury; injury by contre-coup has rarely to be considered. (3) Fracture of the inner table almost always means injury to the brain substance. (4) A complete

operation facilitates repair gives better immediate results and tends to prevent troublesome sequelae more surely than an incomplete one. (5) Death is due in practically all cases to the effect of sepsis on the damaged brain. (6) The aim in all operations should be to remove as much infected material and tissue as is feasible. (7) For ign bodies act deleteriously in four ways by direct effect on delicate brain substance favoring sepsis interfering with circulation and causing scar formation. (8) It is highly important to prevent scar tissue formation whether on or in the brain. The nature of the injury, the amount of sepsis, the presence or absence of foreign bodies and the treatment employed have much to do with the amount of scar formation.

The routine of treatment is as follows. On admission the patient's scalp is shaved, the wound thoroughly examined and two skiagrams taken at right angles to each other and an exhaustive neurological examination made. An aperient is given and urotropine given. If the brain is exposed operation should be done at once and in no case should operation be postponed longer than two days.

The majority of wounds of the scalp should be excised and the bone beneath carefully examined. If no bone injury is found the wound can usually be sutured and primary union almost always follows.

Depressed fracture demands immediate exploration. Some cases without injury to the external table may have fracture of the internal table usually suspected from the location of wounds or the clinical findings. Where the dura is normal in appearance and the brain pulsates well it may not be necessary to open the dura. When the dura is muddy looking and the brain does not pulsate it should be opened up by means of a crucial incision. The useless brain material will usually exude.

An injury to the dura without foreign body or sepsis requires careful trimming of the dura, the lost tissue being replaced by a piece of aponeurosis and the scalp sutured. Where a foreign body or sepsis accompanies the injury its withdrawal is attempted and drains usually inserted along the track.

Injury to the blood sinuses can often be closed by the application of a small piece of aponeurosis. The opening is carefully cleansed and the small piece of fascia then quickly applied.

Lumbar puncture has given relief from persistent headache in many cases but ordinarily no more than 10 ccm should be withdrawn. J H SKILES

Cook, F. S. Bone-Transplantation in Nose Deformities. *Br J M J* 916 21 49

Three cases are reported in detail where bone deformities were corrected by bone transplants. The technique is as follows. A curved incision is made at the root of the nose and the skin dissected free clear to the tip. The periosteum is then raised and raised. A piece of rib (ninth) is then inserted

with its periosteum still attached and sutured in place. The skin is sutured and the stitches removed on the fourth or fifth day. The author claims very good cosmetic result. J H SKILES

Mathews, F. S. Calculi in the Submaxillary Gland and Wharton's Duct. *J M S* 1914 12 11 1430

The author reports 18 cases of calculi in the submaxillary gland and in Wharton's duct, which confirm the rarity of the lesion in an unusually large number. Two of his cases presented the usual symptom of pain and swelling at intervals especially at night, showing the bulbous enlargement of the stone. In others without a preceding history there suddenly appeared inflammation and swelling in the submaxillary region as on parotitis, a high fever not unlike mumps. One case had a hard swelling under the jaw and a high rounded mass of the tissues of the floor of the mouth. Unless the stone is very small it can be readily palpated by manually ven in the presence of considerable swelling. All of these cases made a complete recovery after the removal of the stone under no anæsthesia, the stone passing through the mouth either by dilating a sinus or in passing the duct over the stone. The presence of multiple stones must not be overlooked as a second stone frequently exists. (1914 12 11 1430)

Kazanjian, V. H. Treatment of Maxillary Fractures. *Br J M J* 916 366

These fractures are usually compound and the treatment of the wound is very important but not related especially to the discussion at hand.

The aim is to maintain a comparative immobility of the parts. All the available devices may not be sufficient to affect this condition when much bone destruction is present.

The ordinary case is treated by firm bandage with wiring of the teeth if such is necessary. The care of the mouth is important and antiseptic douches and applications are recommended. The most dreaded complication is hemorrhage. A slight oozing may be the beginning of a serious hemorrhage and should be carefully followed up. J H SKILES

Cole, P. P. and Bubb, C. H. Deformities of the Jaw Resulting from Operation or Injury. *Br J M J* 916 1, 263

In deformities from operations on the upper jaw conditions may be present which require one or more of the following procedures: (1) an attempt to separate the nasal from the oral cavity (2) to restore the masticating surface and (3) to restore the facial contour. The apparatus is usually made of vulcanite and is held in position by aluminum plates.

In simple division of the lower jaw a suitable splint may help in coaptation of the ends. When part of the mandible has been removed the lateral gliding shoes of Lehnert are recommended. When

o e-half of the mandible is removed a modified Gunning splint may prove useful. J H. SKILES.

Weil, R. The Treatment of Parotid Tumors by Radium. *J Am M Ass* 9 5 100 32.

Although recent literature contains accounts of parotid tumors favorably influenced by radium, yet as these tumors are of different types and no information has been given as to the microscopic structure, definite deductions cannot be drawn as to the particular type or types of parotid tumors which are suitable for radium treatment. The case now reported by Weil has reference to a tumor of this kind of seven years' duration, which was histologically examined and classed as adenoid cystic epithelioma. The general type of the tumor was that which Billroth named cylindroma.

The treatment consisted of the insertion of radium into the tumor for six weeks at the end of this period it had disappeared and after an interval of almost two years there is no sign of recurrence.

HOLZLI E. POTTER.

Morestin H. Repair of Losses of Frontal Substances by Means of Cartilaginous Transplants (*Réparation des pertes de substance du frontal à l'aide de transplant cartilagineux*) *Bull d mem Soc de chir de Par* 9 6 211, 212.

Morestin reports the operative details of two rather extensive breaches in the frontal regions repaired by cartilaginous transplants. The technique is relatively simple and the results in such cases are constantly favorable. The cartilage is better taken from the subject himself but it may be borrowed from another operated subject.

In Morestin's first case there was an osseous loss about the size of a five franc piece in the right frontal region between the eyebrows and the root of the nose. After a series of plastic procedures to restore the symmetry of the parts, the breach was finally filled with cartilage taken from another patient.

In the second case where there were also very extensive losses and the right eye had been enucleated, the repairs were effected by material removed from the region of the seventh and eighth costal cartilages of the patient's right side. In both cases excellent results were obtained.

The work is very delicate as it involves reconstruction of the interior part of the upper orbital arcade and the frontal region corresponding to the root of the nose.

W. A. BERGMANN.

Landry L. H. Intracranial Hemorrhage Due to Traumatic Rupture of Arteria Meningea Media; Report of Six Operated Cases with One Death. *South M J* 9 6, 1 57.

It is estimated that 90 per cent of meningeal poplexes prove fatal if unrelieved surgically while of a large series of operated cases 67 per cent recovered, a percentage which would have been much larger had it been possible to secure intervention before the onset of medullary symp-

toms. All statistics favor operative relief those of Bergmann being the most convincing, so successes in 33 operations. The great majority of extradural hemorrhages occur in the lateral aspect of the skull, particularly in the temporal region, those of slight degree not causing symptoms of compression. Ashurst found that a clot between the dura and the bone equaling one-twelfth the capacity of the cranium will produce coma and death in a few hours. The most common source of the bleeding is the torn anterior branch of the middle meningeal artery. Occasionally the hemorrhage has been sought for on the opposite side while in reality it was on the same side as the existing cerebral manifestations at the extremities. The author believes that compression of the opposite side accounts for the collateral paralysis.

Usually the patient is so stunned from the injury that a degree of unconsciousness is produced, from which he recovers only to show evidence of cerebral disturbance headache possibly vomiting and stupor. This free interval was marked in four of the author's cases but was absent in the first two. In the clinical picture medullary symptoms are invariably present the blood pressure is high pulse slow respiration is labored later it is of the Cheyne-Stokes type and finally the paralytic stage of compression supervenes.

Compression from any cause must be removed, whether from depressed bone or epidural hemorrhage. If given proper attention the most terrible injuries of the skull will go on to a good recovery. It is safe to say that in any serious cranial injury in which unconsciousness has been present from the first subdural bleeding is taking place. In localizing the anterior meningeal artery the method of Kronlein is the most acceptable. At the pterion the artery is found passing forward and this point is located by dropping a perpendicular from the bregma to the middle of the zygoma, then drawing a horizontal line back from the external angular process at the junction of these two lines is the Sylvian point the location of the pterion. However the methods of measurement have lost their importance as the surgeon of today explores through a large perture and not by trephining. Usually the injury to the cranial vault is the best guide to the seat of hemorrhage.

The author advocates immediate exploration and decompression in doubtful cases, as such an operation adds no more risk to life and often prevents a fatal outcome.

E. K. ARMSTRONG.

Gosset A. Cranioplasty by Cartilaginous Flap (*Cranioplastie par volet cartilagineux*) *Bull d mem Soc de chir de Par* 9 6 211, 212.

Gosset reports 5 cases of cranial osseous breaches repaired by cartilaginous flaps. Whereas, Morestin, who is the originator of this method usually employs himself several pieces of cartilage in building up and closing the breach Gosset prefers to use one single piece. He thinks this gives better result in

combating pressure from the brain and in the prevention of cerebral hernia W. A. BRYMAN

Frazier C. H. Types of Hydrocephalus Their Differentiation and Treatment 1st J. D. Child 1916 1 95

The author suggests a new classification having a physiological background with direct clinical application

- 1 Hydrocephalus obstructions
- 2 Hydrocephalus nonabsorptus
- 3 Hydrocephalus hypersecretus
- 4 Hydrocephalus oculinus

1 In hydrocephalus obstructions there is mechanical obstruction to the natural drainage of the cerebrospinal fluid from one or more ventricles into the subarachnoid space where the absorption takes place. This obstruction may be due to a congenital defect such as absence of the aqueduct of Sylvius or as is more frequently the case it may be the result of adhesions from a pre-existing inflammatory lesion. If the aqueduct of Sylvius is lacking or closed by adhesions there will be a dilatation of both the third and the lateral ventricles while a closure of the foramen of Munro would cause merely an enlargement of the lateral ventricle on the affected side. If as is often true in cases of high-grade but evenly-distributed hydrocephalus the passage of the fluid through the foramina of Magendie and Luschka is blocked there will be a general dilatation in which all the ventricles participate

2 In hydrocephalus nonabsorptus absorption is delayed or defective as has been proved by the phenolsulphonophthalein test. Whether the restricted absorption is to be attributed to (1) the cutting off of part of the subarachnoid space by adhesions (2) a toxic substance in the fluid which prevents its absorption by the venous channels or (3) whether it is due to an abnormal condition of the agents which transport the fluid to the venous circulation is still a matter of conjecture

3 By a process of elimination and by a careful consideration of the normal physiology of the cerebrospinal fluid and of the possible changes under abnormal conditions the third type with apparent excessive accumulation of fluid has been attributed to hypersecretion—hydrocephalus hypersecretus. Since it has been conclusively proved by morphologic and histologic studies of the choroid plexus by chemical analyses of the fluid by a study of the effect of choroid extract on the secretion of cerebrospinal fluid that the cerebrospinal fluid is the secretory product of the choroid gland it would seem logical to suppose that a pathologic condition of the gland itself or a toxic substance in the fluid coming in contact with the plexus might bring about a hyperactivity of its cells

4 The author includes in the varieties of hydrocephalus a fourth type for which the term hydrocephalus oculinus has been chosen although pathological is otherwise appropriate. The con-

dition thus designated occurs usually in children though occasionally in adults and is characterized by excess of fluid in the ventricles basal system and sometimes throughout the subarachnoid space without there necessarily being any increase in the cranial dimensions. Symptomatically this condition may be more closely allied to tumors but from the point of view of treatment it properly belongs to the prolapsed hydrocephalus in that the essential feature is an excessive accumulation of cerebrospinal fluid in the subarachnoid space

The clinical tests may be summarized as follows

First examination

- 1 Lumbar puncture
- Withdrawal of 1 ccm of cerebrospinal fluid
- 3 Attach a 2 cm. rubber syringe filled with 1 ccm neutral solution of dye
- 4 Withdraw piston until syringe is full
- Inject solution slowly into lumbar subarachnoid space
- 6 Withdraw needle
- Test urine for phenolsulphonophthalein every five minutes until dye is detected
- 8 Estimate the total amount of dye excreted in the first 2 hour specimen of urine

Second examination on the following day or after dye is no longer found in the urine

- Puncture of the lateral ventricle
- 3 Inject 1 ccm neutral phenolsulphonophthalein solution

- 3 Lumbar puncture examine for dye every five minutes until dye appears
- 4 Test five-minute specimen of urine
- 5 Estimate total amount of dye excreted in first two-hour specimen

6 In calculations the amount of dye lost by lumbar puncture must be taken into consideration

The simplest and most effective method of dealing with hydrocephalus obstructivus is puncture of the corpus callosum the Balkenstich of Anton and Bramann

In the non-absorptive type great technical difficulties are encountered with some reservation, because his technique is in the developmental stage the author recommends the establishment of a drainage tract into the pleural cavity. When the lesion is due to hypersecretion he resorts to thyroid feeding. LOWNER & C. KILL

Remsen C. M. The Relation of the Pathological Bases of Hydrocephalus to Its Surgical Alleviation 1st J. M. J. 96 4 15

The condition leading to the development of hydrocephalus may be primary as in the congenital type or secondary to obstruction of the foramina of exit (meningeal adhesions) or of the vein of exit as in brain tumor

Trauma leads tuberculosis sept meningitis brain tumor and chronic alcoholism may be associated with it while tubercular meningitis may lead to fatal hydrocephalus

The author outlines the anatomy and physiology

of the ventricular system and discusses the sources of origin of the cerebrospinal fluid. By means of experimental blockage of the ventricular cavities and stimulation of the choroid plexus the latter have been shown to be the chief origin of the fluid. Likewise other experiments have shown the egress of the fluid to be chiefly by means of absorption into the arachnoid villi and venous sinuses. Hence, an increase in the cerebrospinal fluid may be due to (1) an overproduction by the choroid plexus (2) a disturbance of the principal absorptive system—the arachnoid villi and sinuses or (3) to a mechanical obstruction in the course of its flow from the plexus, through the ventricles and subarachnoid space to the sinuses.

That certain types of this condition (choroid plexus) may be of toxic origin seems probable from the effect of the injection of certain drugs or extracts, since brain, plexus, or pituitary and also muscarine have a stimulating, thyroid a depressing effect upon the secretion. As regards pathological conditions producing symptoms of hydrocephalus, the author points out that large posterior fossa tumors are sometimes without signs of increased fluid tension, and that the important sign of choked disk may not be due directly to the tumor itself but to the hydrocephalus, causing infiltration of cerebrospinal fluid along the optic nerve sheaths and compression of the venous return from the retina. In essential hydrocephalus with no pathological obstruction, vicious circle resulting from excessive accumulation of fluid in the cisterna magna pressing on the veins of Galen which causes increased intracranial pressure and depresses absorptive action is responsible. Forcing upward of the midbrain and plugging of the tentorial opening may also be a factor.

The practical results of obstructive conditions being a cutting off of the secretory from the absorptive systems, it is unlikely that thyroid extract or other therapeutic substances will be of benefit and evidently a communication between the systems must be established. The author mentions the various operations devised for this purpose, and recommends the method of von Brawmann as the simplest. In this a ventriculostomy is performed by the passage of a blunt cannula by way of the longitudinal fissure and puncture of the distended lateral ventricle. The continual escape of fluid into the subarachnoid space equalizes the pressure and conditions approach normal. This operation is indicated both in hydrocephalus of the obstructive type and in essential choroid plexus in infancy, before cerebral destruction has occurred. The technique of the operation is outlined. Flures may be due to closure of the ventriculostomy opening.

HORACE BROOKS

Jacob, F. M. Glioma of the Cerebellum with Metastases. *J Med Res* 1918 9:6 131-95.

Jacob reports the case of a young adult girl with a typical history of brain tumor extending over

period of two years. The autopsy showed a large glioma of the cerebellum which had extended into and obliterated the fourth ventricle and occupied most of the central white matter of the cerebellum. Smaller masses of similar character were distributed upon the ependyma of the lateral ventricle, the central canal of the spinal cord and the leptomeninges. All of these masses were very cellular, unencapsulated, infiltrating and to all microscopical appearance malignant in character. Gland-like and rosette structures were noted in many parts of the tumor. The masses in the ventricle were discrete and had nodular papillomatous structure, but the pia mater of the cerebrum, cerebellum, and cord contained a patchy growth of gliomatous tissue extending over a considerable area involving much of the surface of the brain and cord. He found no masses in any organs outside the cranial and spinal cavities.

From his study the author draws the following conclusions:

Although gliomata of the brain do not invade blood and lymph channels or form metastases in distant organs, they do form metastases in the brain and cord by means of cerebrospinal fluid. The reason for this, he believes, may be found in the fact that glia cells are highly specialized and cannot grow when removed from their natural surroundings.

Even though gliomata of the brain do not metastasize to other organs, many of them, the author thinks, should be considered histologically malignant or at least locally malignant on account of their power of infiltration, rapid rate of growth and the embryonal character of the cells.

GEORGE E. BERRY

Grey E. G. 81 dies on the Localization of Cerebellar Tumors. *J Surg Pathol* 9:6, 1911, 29.

Notwithstanding the comprehensive literature which pertains to diseases of the posterior cranial fossa, the significance of the position of the head and of suboccipital discomfort still remains uncertain. The author has carefully analyzed the symptoms in 60 certified cases of cerebella and extracerebellar tumors from Cushing's neurological service in an attempt to determine a consistent relation between the position of the head and the location of the tumor. About 40 per cent of the cases with cerebellar tumor showed some change in the position of the head while only 7 per cent of the cases with tumors anterior to the cerebellum showed any unusual attitude, and in each of the latter cases the change was slight. The tilting of the head or its rotation in patients with symptoms pointing toward an intracranial tumor is very suggestive of a tentorial new-growth. The attitude has no particular significance in localizing the lesion in one side or the other of the cranial fossa.

Backward retraction of the head occurred in 8 out of the 60 cases and typical opisthotonos attacks appeared in 2 of these cases. As this condition

In the opinion of the author all such cases should be removed even if it involves the ligation and excision of the carotids, and no attempt should be made to dissect the tumor free from the vessels unless it is only loosely attached to them.

Leriche: Resection in the Case of Projectile Wounds of the Neck (*Resection dans les plaies de coude par projectiles de guerre*). *Bull. et mém. Soc. de chir. d. Par.* 96 VIII, 46.

Leriche reports the details in the case of four resections of the neck which he has performed owing to injury of the articulation. Two of these were done within a few days after the injury and the other two were done considerably later. Excellent results were obtained in the last cases, but in the other cases there were defects of lateral movement. Ollier's technique was followed.

In submitting Leriche's report Quénu considers that there are three categories of neck resections: (1) primitive, practiced immediately or in the first days after injury and before there is any infection, (2) early secondary made within a few weeks of injury and (3) late secondary when the acute stage is passed and when only a fistulous trajectory is present or even cicatrization is effected. Quénu thinks that whenever the articulation is involved primitive resection is called for. He reports some cases under each category observed by him with particulars of treatment and results obtained.

W. A. BRIDGES

Eames, J. S., Middleton, W. S., and Smith, A. J. Tonsillar Endamebriasis and Thyroid Disturbances. *Am. J. Hyg.* 96 VII, 2.

The authors discuss the etiological rôle played by an endamebic infection of the tonsils in endemic goiter and give a summary of the present-day conception of the part that is played by chronic infections in the causation of goiter, quoting the work of McCarrison on endemic goiter in India, his opinion being that one of the etiological factors is infection of the intestines from drinking water. He showed how the boiling or filtering of water rendered it innocuous, whereas the feeding of unboiled water to non-goitrous patient was followed by thyroid enlargement.

Farrant is quoted as advancing the first definite evidence of specific bacterial agent proposing the theory and evidence of a mutant colon bacillus in the intestinal tract as an important factor in goiter production through the agency of its toxins. He also quotes Halstead and Billings' views on the part that infections play in the causation of thyroid enlargement.

The authors do not hold that infection is the only factor in goiter but put forth the idea that it is one of the numerous agencies that may influence the development of the disease.

A statistical study was made at the Medical Clinic of the University of Wisconsin, with reference to coexistent infections of the nose and throat in their association with goiter. Of the 1,328 men

examined 27 per cent had thyroid involvement of 363 goitrous individuals examined 90 per cent had nasal and tonsillar infection. In tonsils of 34 cases examined microscopically 97 per cent were found to have endamebic gingivitis (Gross) in the tonsillar crypts. Of 6 individuals of this group who after treatment by emetin hydrochloride were re-examined, 8 per cent were shown to no longer have the organism in the crypts contents. In 23 individuals, to whom emetin was administered a reduction in the bulk of the goiter was appreciable in 8 and in 7 dysthyroid cases included in this group of the cured cases, 6 were benefited in degrees varying from slight amelioration to apparent cure.

Inability to demonstrate endamebic in the thyroid gland renders improbable any direct causal relation of the amebic infection of the tonsils *per se* upon the development of thyroid disturbances. The improvement morphologically and symptomatically in the treated cases leaves little doubt after ruling out vasomotor influence from the emetin employed as to an indirect relationship. A symbiosis of endamebic with appropriate bacteria, leading to the elaboration and absorption into the thyroid of selective thyrotoxic poisons via the blood stream is at least conceivable in explanation of the relation.

It is no sense do the authors care to be understood as advancing hereby an exclusive explanation for all goiters. Other types and their locations of sections capable of producing thyrotoxic toxins, perhaps too toxic substances having a similar influence but derived from metabolic or alimentary fault or even entering the body from without are all possible influences. It is the influence of sympathetic stimulation, however accomplished, to be overlooked. The authors are unable to find, however in any of these lines if thought, any satisfactory explanation of the known occurrence of belts of endemic goiter along certain well-defined glacial drifts.

HARRY G. SLOW

Koch, W. F. The Physiology of the Parathyroid Glands. *J. Lab. & Clin. Med.* 96 I, 399.

After consideration of ductless glands in general and the parathyroids in particular Koch endeavors to elucidate the obscure mechanism of the activity of these glands.

The behavior of the parathyroidectomized dog may he says, coincide with either of two distinct types of symptoms, or with a mixture of these types, in which either may predominate. In one type the dominant feature is over-excitability in the other under-excitability. In the former tonic convulsions are characteristic in the latter we observe peculiar muscular flaccidity and a general depression of the nervous system. In either case a pathological condition develops within a few days after removal of the glands and proves fatal within two to ten days.

Up to the present only one fact which contributes

to the explanation of this pathological process has been advanced it is the discovery by MacCallum that the urines of parathyroidectomized animals contain excessive quantities of calcium and that when calcium salts are injected intravenously into such animals the tetany is immediately controlled. It was shown by Beebe and Berkeley that injections of other salts have a similar though not so marked an effect.

Koch recently found that when the tetany had become uncontrollable by injections of aqueous salt solutions the kidneys had become so pathological as to be unable to functionate normally. Since one of the effects of such intravenous injections is diuretic it may be assumed that one of the beneficial effects of the aqueous calcium injections depends upon increasing the work of the kidney and thus the detoxication of the blood. If on the other hand the value of calcium depends upon the increasing or maintaining of a certain reaction of the blood the acid radicals are here the important factor. They present two possible modes of activity: the simple neutralization of basic substances excessively elaborated within the body or the destruction of such substances as are capable of producing them.

There are then several indications that the tetany of parathyroid insufficiency is due to an intoxication namely that it is subdued by increased diuresis and by the neutralization of toxic factors or the destruction of a toxin by acidity. That the origin of the hypertheoretical toxin substance is the body itself that it is useful and not toxic in the presence of the parathyroid glands and that it is filtered through the glomerulus of the kidney point to a substance hormone like in nature and therefore very unstable chemically.

In the effort to ascertain the presence and identity of such a substance the urines were collected separately from 4 parathyroidectomized dogs. Especially designed cages were used to avoid fecal contamination. The urines were filtered and evaporated to a syrup by an electric fan at a tem-

perature not above 30 C. The residues were dissolved in alkali filtered and evaporated and this process repeated until the last evaporate dissolved readily in alcohol. The lipoids present were extracted with ether and the residue taken up in water. This solution was cautiously precipitated with picric acid. Several insoluble picrolonates were thus obtained and by recrystallization from water and alcohol were purified. These substances were retested physiologically. To one of them were added to the blood pressure when injected intravenously into anesthetized dogs. When injected intraperitoneally into non-anesthetized animals they exhibited very marked toxic effects. Because of the agreement in chemical and physiological properties he considered the substance identified as methylcyanamide and trimethylmelamine.

Physiological tests were made with methylcyanamide isolated from the urines and the synthetic methylcyanamide then injected intraperitoneally in non-anesthetized dogs. These were found to have similar effects. In small doses they produced extreme vasodilatation observed in the reddening of the skin and swelling and reddening of the tongue. Larger doses caused paralysis and convulsions. Still larger doses caused a very rapid death.

The author concludes as follows. The similarity in the behavior of the parathyroidectomized dogs to that of the non-anesthetized animals treated with the substance isolated from the urine is further indication that this substance is responsible for the symptom-complex of parathyroid insufficiency. The data therefore justify the following conclusions:

1. Somewhere in the body methylcyanamide is generated.
2. This substance has a physiological value in normal animals.
3. After parathyroid extirpation the substance accumulates to toxic quantities and is responsible for the death of these animals.

ALBERT EHRENFELD

SURGERY OF THE CHEST

CHEST WALL AND BREAST

Perreau H. Penetrating Wounds of the Chest in Warfare. *Med Press—Cr.* 1916 4, 100

A penetrating wound of the chest requires immediate immobilization of the chest. The diagnosis should therefore be made as soon as possible and doubtful cases should be treated by immobilization also as it can do them no harm and may even expedite healing. The early diagnosis is greatly assisted by the roentgen ray.

The immediate immobilization of the chest is necessary to avoid severe complications. Among these complications may be mentioned (1) Embolism which may be caused by any sudden movement

even after a considerable lapse of time and which may prove rapidly fatal. (2) Pleural effusion is very common and may change to a purulent fluid. (3) Subcutaneous emphysema may occur either local or more or less general. (4) Bronchopneumonia and hemorrhage are rare complications. In order to lessen the liability to these complications immediate absolute and prolonged immobilization is necessary.

The conclusions reached by the author are as follows:

1. An early diagnosis should be made by the aid of radioscopes whenever possible.
2. Immediate absolute prolonged immobilization should be ordered.

3. The patients should be kept on a water diet for the first two or three days, not allowing them to raise the head to drink.
4. Such patients should not be transferred until after a fortnight's immobility.
5. During the first four or five days a daily dose of 10 cc. of camphorated oil should be given.
6. Except when absolutely necessary no attempt should be made to remove intrathoracic projectiles.
7. Prompt, wide opening should be resorted to to give issue to early copious purulent effusions.

J. H. SKILES.

Boothby W. B. Gunshot Wounds of the Thorax.

Beds. 15 & S. J. dist. 9 6 378.

The author discusses his observations on 2 cases of thoracic injuries out of a total of 441 wounds of all kinds treated in the Harvard Unit. The cases observed fortunately included examples of most of the important thoracic lesions which reach hospital care.

Hemoptysis was present in nearly all of the cases. In some it was very slight, lasting for a short time; in others it was present for many days. It was more apt to be present when the lesion occurred from the larger and irregularly shaped missiles.

Hemothorax is a complication which arises from injury to blood vessels belonging to the general rather than to the pulmonary circulation, such as the intercostals, the internal mammary arteries and veins, and the azygos veins. These vessels are not surrounded by muscular tissue, hence the tendency to hemorrhage from them. An additional cause of hemothorax is due to the fact that the blood shows no greater tendency to clot when it is in contact with the endothelial lining of the pleura than it does when in contact with the endothelium of the blood-vessels. Toennissen found that at first the fluid was dark red, with a cell count essentially similar to that of blood, but with fewer red cells and a higher percentage of eosinophiles. The fluid had no tendency to clot in the pleural cavity or when withdrawn. When the vessels had finally stopped bleeding the fluid became brighter red, with a decrease in the number of red cells, though the white cells remained the same. The percentage of eosinophiles gradually increased, as much as 70 per cent. The fluid while showing no tendency to clot in the pleural cavity clotted when withdrawn. During the stage of absorption the fluid became less hemorrhagic and at times almost entirely serous. At this stage it gain lost its clotting power when withdrawn from the pleural cavity.

Pensoldt states that at first the blood is defibrinated, and later as pleuritic irritation develops, an increase in leucocytes occurs with the development of a new blood-clotting substance from the pleural endothelium. When the fluid remains long enough in the pleural cavity this clot-producing substance gradually disappears with the pleural irritation. The presence of the eosinophiles

is due to some local cause as they are not present in increased number in the circulating blood.

Sauerbruch has pointed out that bleeding from lung tissue, or the vessel of the pulmonary circulation is of short duration. The lung tissue itself seems to possess a hemostatic action; the early clotting of blood is also favored by the low pressure existing in the pulmonary system of vessels, and lastly the vessels of the pulmonary circulation are surrounded by a loose tissue which on injury contracts down on the bleeding vessel.

The most important principle in the treatment of hemorrhage is *absol. rest* which favors low blood-pressure and clotting. Since it has been shown that late bleeding is apt to occur in from eight to fourteen days after the injury, it is better to allow a period of rest of two weeks to elapse before extended transportation is undertaken.

Out of 84 post-mortems observed by Bradford and Elliott at Boulogne in which death resulted from chest wounds, 60 had effusion of blood in the pleural cavity. 3 died of complications like purulent bronchitis, paraplegia, or abdominal lesions. 46 died from hemothorax, in 38 of which infection was present. Death from hemorrhage resulted only in one case.

In one group of 168 cases of hemothorax treated clinically 114 were sterile and 48 had such large effusions that it was necessary to aspirate. Twenty-eight infected effusions survived after resection of rib. Twenty deaths were due to infection.

In a second group of 60 cases 63 remained sterile and of these 4 required aspiration, 53 cases were infected and survived resection of rib. Out of 1 deaths 16 were infected. There was one death from simple hemothorax.

The foregoing statistics show the dangers of infection in hemothorax. The authors insist on rest of three days after the receipt of the wound. The patient is then taken as rapidly and comfortably as possible to a place where surgical work may be undertaken with safety.

Aspiration to remove part of the fluid and to thereby hasten absorption should not be delayed unduly since the presence of hematoma favors the formation of dense pleuritic adhesions with time. The military surgeon is often prevented from operating with safety in field practice but whenever he commands his environments for aseptic work the rule of aspirating early rather than late should be practiced. The presence of increased temperature which prompts aspiration is not always the result of sepsis. The rise may be due to absorption of fibrin and it may be further aggravated by respiratory embarrassment and mental worry. The rule is to aspirate in all cases of irregular temperature and to practice thoracotomy whenever pus is found.

When aspiration becomes necessary the amount of fluid to be withdrawn is a debated point. Sauerbruch believes that this should not exceed 50 to 100 cc. If too much fluid is removed the intra-

pleural pressure will be lowered and there will be a tendency to recurrent hæmorrhage. In order to avoid this danger it is better to aspirate with a simple aspirating needle to which is connected a rubber tube 30 cm. long the whole of which is filled with sterile water and the distal end immersed in a basin of sterile water. This method produces a suction equivalent to the difference in the level between the surface of the water in the basin and the level of the needle which may be varied up to 30 cm. This amount of suction can be practiced with safety. The method is less risky than the use of an aspirating bottle and pump with which a negative pressure of considerable amount may be produced by the pump.

In pneumohæmothorax air present above the level of the liquid generally disappears rapidly unless there is a permanent communication with a bronchus. The latter adds to the danger of sepsis and when sepsis ensues thoracotomy is in order.

Cardiac injuries are treated by absolute rest and morphia given in sufficient quantities to keep the patient drowsy. Immediate operation is rarely possible under field conditions at the front. The service that preceded the Harvard Unit removed a bullet by operation that lay free in the pericardial cavity. The patient recovered in spite of an empyema following the operation.

All cases with a patent opening in the pleura become infected. The frequency of infection depends largely upon the character of the missile and the condition of the patient's skin and clothes. Infections are more frequent in proportion to the distance from the front. One observer saw empyema in 3 out of 28 cases, another 2 out of 43 cases. Tullier saw infections develop most frequently after shell wounds and when a foreign body was lodged.

Some observers point to the resistance of the pleura to infection as shown in repeated instances of infected external wounds leading to the pleural cavity in which the pleural wound closed thus warding off infection. It is generally agreed that the pleural membrane and the extrapleural fibrous tissue are very resistant to the passage of infection from the extrapleural to the intrapleural surface. Nevertheless care should always be taken not to open the pleura in cases of large septic hæmatomata that develop extrapleurally and which are not connected with the pleural cavity.

When thoracotomy becomes necessary it should be done at the most dependent part of the cavity and the opening should be large enough to admit the hand for thorough exploration and to remove foreign matter. Such a procedure wards off empyema and enables the operator to remove lodged missiles embedded in lung tissue near the surface.

The author concludes his article with the following summary:

1. Intrathoracic hæmorrhage is most likely to cease when the patient is absolutely at rest; therefore he should be kept in bed (under morphia if necessary) at the first available station.

2. Symptoms rapidly developing suggesting pneumonia with marked dyspnoea are probably due to the production of a large hæmothorax or a pneumothorax. Such cases should be aspirated and sufficient fluid withdrawn to relieve dyspnoea. Care should be taken not to produce a negative pressure within the thorax by the use of an aspirating bottle. A simple needle with rubber tube 30 cm. long filled with sterile water and the open end immersed in a basin of sterile water will produce as great a suction as it is safe to use. With such an apparatus as much fluid can be withdrawn as will run out of its own accord.

3. After three days the danger of infection exceed that of hæmorrhage. Therefore if the patient is not in a place equipped for diagnosing and operating for empyema he should be removed to the nearest hospital so equipped and kept there for at least two weeks.

4. Whenever the patient presents an irregular elevation of temperature exploratory aspiration with a small hypodermic syringe armed with a long needle of large bore should be performed.

5. When ver the pleural fluid is found infected a long thoracotomy opening should be made and free drainage instituted.

6. If the patient is in a dangerous condition prolonged search for the presence of a foreign body should be deferred. However all foreign matter should be removed as soon as possible in order to hasten the final closing of the wound.

L. A. LAGARDE.

Herrick J. F. Enlarged Thymus in Infancy

Surg. Gynec. & Obst. 9: 6 Feb. 1933

The symptoms of enlarged thymus may manifest themselves within a week after birth. The symptoms are very similar to those of a foreign body in the air passages. The respiratory difficulty may manifest itself in all possible grades, from a mild stridor to very severe dyspnoea with fatal termination. The symptoms may be the result of pressure on the trachea on the large vessels or on the right auricle as appeared in one of the following cases. The diagnosis is aided by more gradual onset in increasing trouble, absence of X-ray evidence of foreign body with X-ray shadow of enlarged gland, broadened sternal dullness, negative laryngoscopic findings and failure of intubation to relieve. The child is usually well nourished but the complexion is usually pale and pasty. There is no disturbance of pulse or temperature. The treatment may be surgical or X-ray. The former is at times followed by death. The latter is safe and effective.

Six cases are reported. Case 1, aged 1 year, died under anesthesia. In an effort to locate a foreign body, autopsy revealed a very large thymus overlying the right auricle, no foreign body present. Case 2, aged 3 years 7 months, symptoms present since the child was 3 years of age. The child died suddenly without treatment. Case 3, aged 6 months, symptoms began when child was ten weeks

old Symptomatic treatment only was given. The child was living but in a serious condition when 6 months of age. Case 4 aged 4 weeks symptoms present since two weeks of age, attacks very severe. Treatment with X-ray was followed by recovery. Case 5, aged 8 months symptoms present since first week after birth. Treatment by X-ray recovery. Case 6 aged 2 months symptoms present since first week of life. Treatment by X-ray recovery.

TRACHEA AND LUNGS

Villeon, P. de la. The Surgical Extraction of Intrapulmonary Projectiles, Superficial and Deep, Under the Screen by Simple Rapid, and Certain Means (L'extraction opératoire des projectiles intrapulmonaires, superficiels et profonds, sous l'écran, par un procédé simple rapide et sûr). *Bull. Acad. des méd. Par.* 9 6 1914 75.

Thoracopneumotomy for the extraction of intrapulmonary projectiles has been practiced by the author with uniform success.

He also uses a method much simpler and more rapid which was carried out successfully in 20 cases.

The principles of this new procedure are based on the method for using the radioscopic screen for the extraction of intrapulmonary projectiles, which was originated by Madaire. Villeon's technique is different from that of Madaire in that it allows the extraction of deep as well as superficial projectiles.

The projectile being located by X-ray the anesthetized patient is placed under the screen, in

dorsal or abdominal position, according to the nearness of the projectile to the anterior or posterior surface of the lung. The projectile makes a shadow on a point of the thoracic parietes. Two or three finger-breadths away in the intercostal space by means of tenotomy or a fine blade a narrow 5-mm. buttonhole incision is made in the skin. Through this incision is introduced a closed forceps (long Pean, long Kocher) or an old style forceps for the extraction of bullets. This forceps passes with difficulty into the narrow buttonhole incision, and following a line oblique to the normal of projection, leads directly to the projectile. It turns aside before it the intercostal fibers, grazes the upper border of the inferior rib (to avoid wounding the vessels) and always closed, goes through the parietal pleura, then the visceral pleura. It then enters the parenchyma where by a gentle handling it is pushed up to the projectile and touches it.

At this moment the X-ray operator intervenes for the second time to ascertain whether the forceps is in the right place. If not to correct the direction. The forceps touches the projectile and mobilizes it. The forceps then opens gently catches the fragment and extract it as the opening through which the forceps enters the skin incision is very small on withdrawal not a particle of air enters hence no pneumothorax result. The operation lasts but a few minutes, frequently only a few seconds, in difficult cases, 5 to 7 minutes. In simple or typical cases, 4 to 6 seconds. With one suture the buttonhole incision is hermetically closed immediately after the regular dressing is applied. The patient is returned to bed, and receives hypodermic injection of 0.03 cc. of morphine to avoid excitement upon waking and to insure respiratory quiet. In cases of large projectiles, the skin incision is enlarged only when the forceps with the projectile in its blades reaches the skin opening, which can be enlarged as required.

In cases of deep projectiles (8 to 12 cm.) the author employs an old model long bullet forceps.

This sort of instrumentation has given satisfactory results in 6 cases, and only in a very few cases did any air enter the pleural cavity or slight subcutaneous emphysema result incidents without consequence, all of which the author hopes to avoid in the future by using forceps (on the style of Gruenvald) which he is now constructing.

It sometimes occurs that when the lung is free of all attachments, the forceps does not penetrate the parenchyma at the first attempt which occurrence permits of invagination and depression. Slight force may be safely used on the visceral pleura in order to enter the parenchyma. The organ resumes its normal shape and the setting is easily done. The post-operative sequelae are of extreme simplicity. Slight blood expectorations for two or three days thereafter are of importance.

The day following the operation, the patient may sit up in bed. The author's patients left the hospital on the fourth day. In a few serious cases on the eighth day. All cases were devoid of post-operative pyrexia. The fever curve remained at 37°C. All symptoms disappeared in four weeks.

The author never uses costal resection and never has been troubled with pneumo- or hemothorax.

This technique has been used by the author in 6 cases, withdrawing 17 projectiles: 9 superficial 8 deep (6 8 to 12 cm. deep) 6 in fixed lung.

RAOUL L. VIGNAN

SURGERY OF THE ABDOMEN

ABDOMINAL WALL AND PERITONEUM

Wallace C. Tabular Statement of 500 Abdominal Gunshot Injuries. *Lancet Lond.* 9 6, 1914, 502.

Wallace gives a very interesting tabulation of 511 abdominal gunshot injuries. The table which is a

large one shows the nature of the operations performed and the character of the lesions encountered. The cases were brought to two field hospitals devoted to the care of abdominal wounds, which were well advanced to within 5,000 yards of the fighting line. Like all statistics gathered so near the front,

the mortality appears greater than one is apt to observe further away on the line of communication. The principal facts obtained may be summarized as follows:

Total number of cases	
Admitted number of	
Total mortalities including hemorrhage	8 per cent
Total mortalities including hemorrhage	14 per cent
Considered hemorrhage upper case	no
No operation considered with side	
Total operation mortality	19 per cent
Total operation mortality	19 per cent
Stomach incomplete mortality	17 per cent
Small gut complete mortality	5 per cent
Small gut incomplete mortality	no

The next table gives approximately the number of times the viscera were injured; the unoperated cases not being included:

	None of H.M.	With H.M.	Total
Stomach	no	no	no
Small gut			
Great gut			
Liver			
Pancreas			
Kidney			
Bladder			
Uterus			
P. area			

In the small gut resection has a higher mortality than suture, but this is doubtless due to greater initial injury among the resected cases. The actual junction line in the resected case rarely gave trouble. Three cases of obstruction were due to non-toxic paralysis. Resection is to be used instead of suture when the saving of time is an object. Contused edges were found to heal well and without slough after suture. The soldier's small intestine is usually empty — the converse is true of the large gut.

Of 23 stomach wounds only 11 were uncomplicated by other lesions; the anterior wall was most often involved; anteroposterior wounds were not common; food extravasation of stomach contents was fairly frequent depending on the time of the last meal.

Of 7 fatal cases of stomach injury, uncomplicated by wounds of other hollow viscera, 4 died as a result of primary hemorrhage. The author dwells on the seriousness of wounds of the epigastric region, and he favors operation in all cases.

The absence of injury to the spleen in stomach injuries was notable and it suggests that such injuries seldom live to reach surgical care.

In the large intestine the mortality was 60 per cent as a result of peritonitis or perhaps more frequently septic infiltration of the retroperitoneal tissue. Wounds of the transverse colon are more apt to be multiple than those of the other divisions of this gut.

Considering the extent of the injury, the wounds of the great gut are much more fatal than those of the small gut, no doubt due to the greater toxicity of the great gut contents.

Most of the injuries of the liver were explored for

hemorrhage. A good many cases might have recovered without operation.

It is suggested that a good many spleen cases recover spontaneously and that it is only when the vessels are torn that bleeding is excessive. The kidney and spleen seem to be not uncommonly injured at the same time while the stomach nearly always escapes.

Walker M. H. Jr. and Ferguson L. M. Peritoneal Adhesions Their Prevention with Citrate Solutions. 1915. Philadelphia 30

The authors have performed more than 100 experiments upon rabbits with the idea of discovering the exact effect of hypertonic solutions of sodium citrate and sodium chloride upon the peritoneum and upon peritoneal adhesions. By careful histological examination of sections made of adhesions taken from one to fifteen days after operation they find the pathology of adhesion formation is simply the process of healing as found where ever tissue has been destroyed.

First an inflammatory exudate of serum and blood is poured out and quickly coagulates. This exudate is composed of fibrin with a few red and white blood-cells in its meshes. The adherent fibrous exudate is the framework upon which the fibrous adhesions are built. Within 48 hours the connective tissue and endothelial cells at the base of the adhesion begin to proliferate. Fibroblasts and new blood vessels appear very rapidly until at the end of a week the adhesion is made up of a fairly dense fibrous tissue containing a moderate amount of blood vessels with no inflammatory exudate. As time goes on the vessels become less numerous and the fibers of the adhesion appear to reach in among the muscle-bundles of the muscle coat of the bowel or of the abdominal wall as the case may be. Meanwhile the endothelial cells of the peritoneum have proliferated and covered the abdominal surface of the adhesion. The final appearance of the adhesion is simply that of a dense scar tissue band covered with peritoneum.

As the result of their experiments the authors conclude that hypertonic citrate solutions do under certain conditions prevent peritoneal adhesions after laparotomy. The best solution is sodium citrate 3 per cent and sodium chloride 1 per cent. Theoretically in human surgery after clean laparotomies a sufficient amount of solution should be introduced into the abdomen to bathe the whole peritoneum (500 to 600 ccm.) and smaller amounts would be of little value.

The authors have not used the solution in human surgery and suggest that the question of shock must be considered and determined by actual tests in the operating room. They believe that if gauze packs used to wall off the intestines are wet in citrate solution much fewer adhesions will result. Adhesions cannot be prevented in the presence of infection by any known method. Large areas of denuded

peritoneum should be covered by plastic operations, for the larger the denuded areas left, the greater the likelihood of adhesion formation. Iodine should be used with great care as very little if allowed to touch the bowel causes masses of adhesions. Dry gauze should not be used inside the abdomen.

G. NEWSON.

Pope, S. The Prevention of Peritoneal Adhesions by the Use of Citrat Solution. *Ann Surg Phila.*, 9 6 1911, 205

Two years ago the author advocated the use of sodium citrate with sodium chloride in solution for the prevention of peritoneal adhesions. His reasons were based upon experimental work done upon rabbits. Since that time with Wallace Terry he has used a solution of citrate of soda per cent with sodium chloride per cent in some 400 abdominal sections. In about 20 cases from four ounces to a pint of this solution was left in the abdominal cavity. In the other cases, the gauze pads and sponges were moistened with the solution. There is no evidence to show that the liability to infection is increased by this treatment, but on the contrary where peritonitis is present, a marked improvement seems to have occurred. The quantity of solution was left in the abdominal cavity of such cases as general post-operative adhesions, acute obstructions, post-tuberculous, colectomies, resections, and tuberculous peritonitis. The abdominal wounds show more oozing during closure in these cases, but in no case was there evidence of post-operative hemorrhage or failure of union. This procedure causes pain and partially rouses the patient so that it has been found expedient to have the incision almost closed before introducing the liquid. Ten of these cases have been reopened so that the benefits could be judged by inspection. The purpose of the citrate is to abolish excessive fibrin deposit with subsequent adhesion formation as it will not prevent inflammatory repair.

GATEWOOD.

Bayne-Jones, S.: Eventration of the Diaphragm, with Report of a Case of Right-sided Eventration. *Arch. Int. Med.*, 9 6, xvii.

The author reports a case of eventration of the right side of the diaphragm. This diagnosis, made from physical examination, was the first of its kind determined during the life of the patient. The clinical impression was confirmed at operation.

The author has collected from the literature 45 cases of eventration of the diaphragm. Of these 3 were right-sided and 42 were left-sided lesions.

In the differential diagnosis between eventration and allied states, the author points out difficulties, particularly with regard to the differentiation from hernia of the diaphragm. He believes that no single method is capable of establishing this differentiation, but the combined methods render the diagnosis reasonably certain.

He summarises the various etiological hypotheses,

showing that the weight of evidence is in favor of the opinion that the disease has a congenital origin.

GEORGE D. BURLAY

GASTRO-INTESTINAL TRACT

Dewis, J. W. Aids in the Diagnosis of Surgical Conditions of the Stomach with Especial Reference to the Characteristic X Ray Appearance of the Syphilitic Hour Glass in Contrast to Those of Simple Ulcer and Cancer. *C. ad M. J.* 9 5 56

The author believes that the greatest single aid in detecting cancer of the stomach and in differentiating this from ulcer is the X ray. It is not easy to differentiate cancer from syphilitic ulcer of the stomach, and even the X ray may fail to detect cancer near the cardia. In the lower two-thirds of the stomach the X ray examination ought to show cancer in every case if properly done and correctly interpreted and in the majority of cases it will detect cancer earlier than clinical methods.

On the other hand to determine whether cancer of the stomach is surgical and when inoperable, while the X ray is a valuable aid the chief means are the ordinary methods and the experience and judgment of the clinician. The author thinks that surgery should be the treatment in all early cancers of the stomach but that the reverse is true in ulcer of the stomach and oedema except where there are acute perforated ulcers.

Regarding chronic ulcers whilst some extreme internists are so convinced of the probability of ulcers healing that they would persist in the medical treatment of practically all ulcers, yet it does not seem likely that an ulcer of the stomach or duodenum with a history of twenty or thirty years duration can be cured within a month or two of medical treatment of any kind.

Chronic ulcers of the stomach become surgical under these conditions when there is chronic pyloric obstruction not relieved by medical means when there is permanent hour-glass contraction in the cases where pain and distress, sour regurgitations, and intractable dyspepsia do not yield to treatment and finally when there are severe hemorrhages.

In syphilis of the stomach the first clue is a history of infection confirmed by the Wassermann test and the X ray. The X ray is most valuable in a differentiative test. Pictures of syphilis do not show the moth-eaten appearance of cancer and there is much more involvement of the stomach wall than in simple ulcer. But the characteristic point that differentiates syphilis from cancer and simple ulcer is that in syphilitic hour-glass stomach a long regular isthmus is seen, at each end of which the walls of the stomach rise more or less abruptly to dumb-bell like. This is in contrast to the sharp incision of simple ulcer hour-glass with practically no isthmus and the picture differs quite as much from the cancer hour glass with the infiltrated walls of the stomach sloping irregularly away from the constricted portion.

HOLLIS E. POTTER.

Squires, J. W. Roentgen Ray Diagnosis of Gastric Lesions. *V. J. M. J. 9, 61*

For the purpose of roentgen ray study the author divides stomach lesions into two groups. The first includes tumors, chronic ulcer, adhesions, and syphilis, lesions which produce permanent defects in the stomach's contour. In the second group are included acute simple ulcer and exudative lesions or lesions which produce a temporary change in the stomach's contour. In either case a positive diagnosis cannot be made without the aid of the roentgen ray.

In early carcinoma the radiographic findings are very similar to those in ulcer, and at this stage it is impossible to determine by the X-ray whether or not malignant degeneration has occurred. From an X-ray standpoint, however, the important line of division is not between benignancy and malignancy, but to determine whether the lesion has advanced sufficiently to be in a surgical case. This stage is determined by the production of permanent defects in the contour, six-hour stasis, and interruption of normal peristalsis. The author emphasizes the importance of careful observation of gastric ulcers in the precancerous stages, as on its early recognition depends successful treatment.

Radiograms are taken immediately after a test meal and every half hour after or even more frequently until sufficient data are obtained. This is followed by fluoroscopic examination.

The diagnosis of gastric carcinoma requires a very careful consideration of the radiographic and fluoroscopic observations. The characteristic findings in order of importance are: (1) filling defects, (2) absence of peristalsis in part involved, (3) mobility, (4) superimposing test, (5) pain at site of filling defect (fluoroscopic), (6) changes in the pylorus, (7) residue, and (8) advanced position of test meal in six hours.

The filling defect is the most valuable as it is constant and is not affected by stomach peristalsis.

The various characteristic findings are shown in illustrations accompanying the article.

The diagnosis of gastric ulcer is similarly based on radiography and fluoroscopy. In the case of chronic ulcer the following signs are basic: (1) permanent irregularities in contour of stomach or cap, (2) interruption of peristaltic contractions, (3) in cicatrix, and (4) locating pain directly over defect (fluoroscopic).

HOLLY L. POTTER

Palmer, C. L. The Significance of Certain Roentgenographic Findings in the Gastro-Intestinal Tract. *J. Am. M. J. 9, 61* 493

Normally the stomach can change its position without the help of alteration in body posture. When this mobility of the stomach is lacking it is either due to restraining forces which prevent the movement, or else to lack of power to move. The former is the most frequent cause for lack of change of position of the stomach.

Persistent supraposed stomach is due to a re-

straint and not to lack of power. This restraint is most frequently exercised by adhesions due chiefly to healed acute chronic appendicitis, traumatic peritonitis, operation, or gastritis due to syphilis and ulcer.

Persistent intragastric distention is not a frequent supraposed stomach. It is usually a by-product of lack of power to move, and is frequently a lack of power which is the cause in chronic gastroenteritis, or with relaxation of the abdominal wall.

Long retention of the gastric contents, twenty-four hours or longer, is due to pyloric anastomosis, an obstruction of the stomach. The other chief cause is long-standing chronic cholecystitis. Retention of a short time, six to twenty-four hours, has for its most frequent cause, cicatricial contraction of the pylorus due to healed ulcer, chronic appendicitis, chronic cholecystitis, phlebitis, and syphilis.

Pylorospasm is local, but it is not always present when extragastric lesions are prevalent. It probably depends on the reflex excitability of the individual nervous system.

Diagnosis is made by judging from the roentgenograms together with the history of the case and other clinical evidence obtainable are correct in nearly every case. This was demonstrated in the majority of the cases by subsequent operation or necropsy. In most of the others it was shown with a satisfying degree of probability by the subsequent course of the case.

Roentgenograms have revealed certain facts which can be demonstrated by other means. The most prominent of these are the obstructive lesions which are as a rule located either in the pylorus of the stomach or in the region of the cecum and are usually due to definite conditions.

By the use of the stomach-tube in gastric analysis, fecal examinations, the charcoal test, Baret's test, and careful analysis of clinical symptoms and physical signs, it is possible in a certain number of cases to make a very accurate diagnosis without the use of the ray. In all cases which are readily diagnosed without the ray, however, roentgenograms should be taken and carefully interpreted along with laboratory tests, clinical history, and physical findings, in order to obtain a clear diagnosis.

EDWARD L. C. R. ELL

Mann, F. C. A Study of the Gastric Ulcers Following Removal of the Adrenals. *J. C. P. M. J. 9, 61* 101

Mann noted at autopsy that animals dying after the removal of both adrenals showed a rate ulceration of the gastric mucosa in a large number of cases, and he states that other investigators have noted similar results. As no lesion of the gastric mucosa was found at autopsy in a series of more than 100 practically normal animals, it seemed to the author that spontaneous ulcers were not common in these animals. He therefore subjected a large series of animals to adrenalectomy, and the results

were studied. The lesions he found in the gastric mucosa after death from adrenal insufficiency consisted of two main types, one a wide-spread superficial erosion the other a true punched-out ulcer formation. The gastric erosions practically always occurred in the fundic division and in most cases, the author states the pyloric mucosa appeared normal. The duodenal mucosa was usually congested in the adrenalectomized animals, and in several instances there were definite ulcers. These duodenal ulcers occurred just distal to the pyloric ring and appeared like cratered areas about 1.5 cm. in diameter. They were deeper at the center than at the edges, penetrating to the muscularis mucosa at the center and they showed no evidence of hemorrhage.

To summarize briefly acute ulcers of the gastric mucosa are found in a large percentage of dogs and cats dying after adrenalectomy. These ulcers seem to develop during the moribund period. They are apparently peptic ulcers forming at the site of local hemorrhages in the gastric mucosa. They are true acute ulcers, usually penetrating to the muscularis mucosa with a total loss of epithellium. They develop in the absence of pancreatic secretion and bile. However they appear to develop only in an acid medium.

GEORGE E. BRADY

Friedenwald, J. The Modern Method of Treatment of Diseases of the Stomach. *Thorp Gaz.*, 9 6 21, 77

The treatment of diseases of the stomach was discussed with regard to the use of the stomach-tube, with regard to the diet, to the use of medicinal agents, of mechanical supports, of mineral water cures, and with regard to surgical measures.

Friedenwald classified the indications for operation under three heads, as follows:

Obstruction. Gastrectomy is indicated in impermeable stricture of the cardiac orifice of the esophagus. In benign obstruction of the pylorus pyloroplasty gastro-enterostomy or pylorotomy is indicated. In malignant disease pylorotomy is indicated for cure and gastro-enterostomy for relief.

Gastric ulcer. The indications for operation are perforation, pyloric obstruction and ulcers resisting medical cure. The operations indicated are excision of the ulcer pylorotomy pyloroplasty or gastro-enterostomy.

Gastric carcinoma. An exploratory incision should be urged in all cases over 40 years of age with manifest symptoms of indigestion which are not relieved by a few weeks of medical treatment and in which the diagnosis is still doubtful after a thorough examination.

J. W. TURNER.

Case, J. T. Roentgen Studies After Gastric and Intestinal Operations. *J. Am. Med. Ass.* 9 5 17, 638.

For several years Case has pursued the roentgenologic study of patients after gastric and in-

testinal operations. The results of this study are given under the headings: (1) Acute small bowel obstruction, (2) gastro-enterostomy, (3) appendectomy and (4) ileocolostomy.

Experience has shown the value of roentgen examination in the diagnosis of post-operative acute small bowel obstruction with special reference to the decision as to the advisability of surgical interference. No barium or opaque meal is usually given, the observations being made by the gas distention of the intestine.

After gastro-enterostomy it has been believed that the rapid exit of food from the stomach was prevented by the formation of rhythmically contracting constriction rings in the duodenum. The author has observed analogous action in a large number of cases in which the ordinary gastrojejunostomy had been performed viz. sort of sphincter action established in the jejunum at a point varying from 3 to 6 cm. below the gastrojejunal anastomosis.

Case says that after gastro-enterostomy there is stagnation of food in the jejunum near the site of the gastro-enterostomy due to the inhibition of onward peristaltic activities at this point.

The occurrence of cecal stasis following appendectomy is very common. Case believes that retention occurs at the site of the stump of the appendix, and that it has some relation to the invaginating suture by which the stump is usually buried.

Most of the cases examined all in fact except those cases in which an artificial ileocolic valve had been formed have shown incompetency of the ileocolic stoma permitting an *enema* to flow back into the small bowel as well as retrogradely around the colon to the cecum as far as the stump of the colon. In long operated cases especially there is very definite ileal stasis.

From his studies Case states that in a very considerable percentage of cases in which the operation of ileosigmoidostomy is performed for the relief of intestinal stasis, the end result is infinitely worse than if the patient had not been operated on at least as far as the stasis is concerned.

H. L. E. PUTNAM

Downes, W. A. Operative Treatment of Pyloric Obstruction in Infants; Review of Sixty-Six Cases. *Surg. G. & Obs.* 9 6 21, 5.

The author reports 66 cases operated upon 1 five and one-half years. All presented the characteristic symptoms. A tumor was palpated in every case before operation.

The theory best explaining the symptom-complex is that a true malformation is present at birth consisting of an abnormal thickening of the circular muscle of the pylorus, and that this is added to an edematous condition some ten days or later after birth. The edema probably results from the increased activity of the stomach necessary to force an increasing amount of food through the narrowed and elongated pyloric lumen.

Gastro-enterostomy was performed upon 31 of the 66 cases the remaining 35 being operated on according to the Rammstedt method. Of the 31 cases in which gastro-enterostomy was done there were 11 deaths—a mortality of 35 per cent. Of the 20 discharged as cured afterwards died of gastro-enteritis and 1 died of diphtheria. The remaining 1 are well and have developed normally. Roentgen-ray examination shows the stomach working satisfactorily and little or no bismuth passing through the pylorus.

Not satisfied with the results from gastro-enterostomy it was decided to try the partial pyloroplasty of Rammstedt. Consequently this operation has been done in the last 3 cases. In this series there were 5 deaths—a mortality of 33 per cent. Of the 3 cases discharged as cured 2 have died in leaving the hospital the remaining 1 are well extending over a period from a few weeks to one and one-half years. In no case has there been a return of the symptoms.

The cases operated on according to the Rammstedt method vomited less and were easier to feed after operation.

The advantages of the partial pyloroplasty over gastro-enterostomy are (1) time consumed for operation the former requiring less than half the time necessary to perform the latter (2) the operation requires much less surgical skill than gastro-enterostomy and (3) the continuity of the gastro-intestinal tract is preserved. Roentgen ray examination one and one-half years after operation and autopsy on one case dying three months after operation demonstrates the fact that the stomach functions normally and that the tumor entirely disappears after this procedure.

Jefferson G. Ulcer of the Duodenopyloric Fornix.

4 5 6 Phila. 910 Nov 18

As is well known, duodenal ulcers have a peculiar partiality for that part of the duodenum immediately adjoining the stomach and the probable rôle of the gastric juice in the production of these ulcers is obvious. The pylorus when viewed from the duodenum appears as a knoblike projection formed by the massive muscular ring which constitutes the pyloric sphincter. The furrow which surrounds this knob is termed the duodenopyloric fornix. The depth of this sulcus varies considerably, being shallow in relaxed hypotonic stomachs and especially well marked in duodenal ulcer where gastric hypertonus is the rule. Owing to the absence of valvular connexions in the suprapyloric duodenum the examination of the interior of this part is relatively easy and it is almost impossible to overlook an ulcer unless it be situated on the posterior wall and hidden by the projecting pylorus.

The author believes that the duodenopyloric fornix is a frequent site of ulcer and that ulcers usually located as pyloric, a term which suggests gastric origin are really duodenal. Chronic ulcers of the stomach rarely in the pyloric canal

and when they become more distant from the pylorus while duodenal ulcers become more frequent as the pylorus is approached. The result of ulcer in this location is the destruction of the usual landmark, making it very difficult to tell the exact point of origin of a duodenal ulcer. Cases are now on record in which the duodenal ulcer has been quite healed while the invasion of the pylorus has become malignant. The great difference in the frequency of antral and follicular duodenal and gastric ulcers makes differentiation extremely important.

GATEWAY

Bryan R. C. Ulcer of the Jejunum

(1) 10 Nov 10

Ulcer of the jejunum is apparently a most rare condition there being only four cases recorded in the literature which arose spontaneously and independent of a previous gastro-enterostomy. The author case was that of a man 45 years old with a history of three years' duration of gastric pain which had been diagnosed as ulcer of the duodenum. He was suddenly taken with severe abdominal pain followed by collapse 12 hours later operation was performed. The stomach was bound down hard and firmly pulled to the left and firm. About 1 inch from the duodenojejunal juncture a round punched-out ulcer about the size of a cherry stone was found. The patient died the following morning.

Diagnosis of this condition apparently must be based upon deduction derived from observation of jejunal ulcers forming after a previous gastro-enterostomy. According to the more recent theories these ulcers develop from autoinfection of the mucosa by an acid action which has been poorly modified by the alkaline products of the upper gut.

This has in a measure been corroborated by the experimental work of Exalto, Kathe, Wullenstein and more recently by Cohen of New York. Willis has done some interesting experimental work on dogs in which he performed gastro-enterostomies administering various amounts of hydrochloric acid thus noting the development of jejunal ulceration. The author is not certain but that there is an association of this condition also with the late

initis plastica of the gastro-intestinals, sclerostenosis of Krompecher. In appropriate cases excision, resection, or enterectomy are apparently the operations of choice.

Deaer J. B. Acute Appendicitis

10 Nov 10

Appendicitis is the most common intra-abdominal inflammation and the appendix constitutes the avenue by way of which infection most commonly invades the upper abdomen. There are three portions of the appendix in relation to the appendix: the ileocecal, the ileocolic and the ileocecal. The appendix being occasionally buried in one of the latter two thus explaining why the organ is believed to be bent. The author has never failed to find an appendix in the man cases he has operated upon.

The appendix may be found below and to the outer side of the cecum, to the outer side of the cecum and colon, pointing upward and outward behind the cecum pointing upward to the inner side of the cecum lying beneath or above the terminal mesentery of the ileum and pointing downward, occupying the false and even the true pelvis. Thus the location of the point of tenderness and of referred pain must differ in particular cases, and symptoms pointing to gall bladder, duodenal, pyloric, pancreatic, or pelvic disease may arise.

The etiological factors of importance are age, previous attacks of appendicitis, catarrhal conditions of the gastro-intestinal canal, infectious diseases, especially influenza and digestive disturbances, the latter resulting in a great increase in the bacterial flora of the intestine.

The peritoneum defends itself by the function of exudation and absorption, the former enabling it to form adhesion of protective character and any treatment that breaks down these adhesions, such as purgation, defeats that protective function and may be harmful in the extreme.

Appendicular abscesses are met with in several situations: (1) in front of and to the outer side of the cecum, the pus being confined by the cecum, small bowel, omentum, etc. (2) to the outer side of the cecum and ascending colon or behind the cecum in the layers of the mesocolon. (3) in the pelvis (4) near the median line to the median side of the cecum (5) free in the abdominal cavity or existing in the shape of many pockets between the coils of the intestine. In addition there are seen secondary abscesses, which occur close to the original abscess, residual abscesses occurring at the site of the primary abscess, and metastatic abscesses, which occur at any point distal to the site of the original, such as a paracolic abscess, pyelophlebitis, etc.

The clinical history is typical, a previously well individual being seized with acute abdominal pain, first referred to the umbilical or epigastric region and accompanied by vomiting. The pain soon becomes localized to the right iliac fossa and muscular rigidity is noted. If this sequence is interrupted, the diagnosis of acute appendicitis may be doubted. Fever is always present. If the appendix is in the pelvis the pain is likely to be left-sided. Suddenly subsiding pain followed by a chill points to gangrene, while exquisite tenderness denotes the presence of pus. The differentiation of importance lies between acute cholecystitis and appendicitis.

The treatment is comprehended in the following points: (1) examine the patient thoroughly and not through the clothes (2) give no aperient medicine (3) $\frac{1}{16}$ to $\frac{1}{8}$ grain of morphine will not mask the symptoms and may be safely given when the pain is severe (4) the diagnosis having been made the proper measure is immediate operation. In the presence of peritonitis and in the absence of operation set the patient up in bed give nothing by mouth place an ice-bag over the tender area, and

institute enteroclysis. Operate in the cases of localized peritonitis where the lesion can be localized and there is peristalsis in the surrounding region of the abdomen. In diffused peritonitis defer operation until the peritonitis becomes a localized one.

E. K. ARISTOTELIS.

Mayo, W. J. Radical Operation for Cancer of the Rectum and Rectosigmoid. *T. Am. Surg.* 455 Washington 9 of May.

The author discusses: (1) operability (2) operative mortality (3) operative disability (4) the action following operation, and (5) permanent cure, on the basis of a study of 753 cases of cancer of the rectum and rectosigmoid examined in the Mayo Clinic between January 8, 1901 and December 3, 1905. Of these, 43 were subjected to radical operation.

Six hundred and nineteen cases gave an operability of 53 per cent. Radical operation was seldom refused because of the local extent of the disease. Had it been possible to know the extent of the disease previously in some instances patients would not have been operated on, though many in a very advanced stage were cured. Lymphatic involvement is usually late and in no case was lymphatic extension alone the cause of inoperability. Theoretically the abdominal cavity should be explored in every case because of the frequency of metastasis in the liver and peritoneal cavity. In very few patients the posterior crural operation in one stage may be wise.

In 43 radical operations the operative mortality was 53 per cent. During the last three years, in spite of the fact that 78 patients in each were operated on, the mortality has been reduced to 25 per cent. It has now been brought to about 10 per cent. In cases in which the disease in the rectum was movable the mortality was under 5 per cent. All patients dying in the hospital are classified as cases of operative mortality without regard to length of time that death occurred after operation. Necropsy was secured on 95 per cent of patients dying in the hospital. The mortality in any given statistical group is low with low operability. High operability includes cases of advanced disease which greatly increase the mortality. Comparative statistical data of operative mortality means nothing unless the total number of patients examined whether operated on or not, is taken into consideration.

The causes of operative mortality are: (1) sepsis, 39.8 per cent, usually due to soiling of the operative field with the infected contents of the involved bowel because the rectum had become fixed and the growth had penetrated its walls (2) nephritis, 3 per cent acute developing on chronic (3) metastatic tumors undiscovered on exploration, 15 per cent (had the true condition been known operation should have been performed) (4) death from hemorrhage, 6.5 per cent, in no case immediate, but blood-loss led to exhaustion, sepsis, etc. No case of shock without hemorrhage. Secondary hemorrhages were not truly secondary but rather a continuation of badly

controlled hemorrhages (5) death due to exhaustion etc. often some days or weeks after operation.

When aseptic healing took place patients were discharged from the hospital as early as sixteen days and returned to work in thirty days. Infected wounds healed in from four to twelve weeks but the patients were not able to return to work for three or four months.

The best function followed the tube resection described by Balfour and the C. H. Mayo method of direct end-to-end union. The Wier invagination method gave excellent results when it could be used. In the Gripps operation although the entire sphincter was removed the functional results were as a rule excellent. In the majority of cases the radical operation necessitated a colostomy in the abdomen or a posterior anus more or less uncontrollable. The Mixer malilone colostomy proved most satisfactory.

As to permanent cures of the 430 patients on whom a resection was done 364 recovered from the operation. Eliminating those who were operated on less than three years ago 33.3 per cent have lived three years or more and 26.3 per cent have lived five years or more after the operation. These percentages may be fairly increased to 33 and 35.4 per cent respectively by subtracting from the mortality figures the normal death rates for corresponding ages for periods of three and five years (i.e. 4.2 and 7.5 per cent).

LIVER, PANCREAS, AND SPLEEN

Collins, C. U.: Indications for Cholecystectomy and Cholecystostomy. *Illnesses of the Gallbladder*, 1906, p. 30.

Letters were sent to 14 patients who had recovered from cholecystostomies asking if they had had any trouble with the gall bladder or stomach since the operation. In all 102 replies were received 74 said they had been perfectly well so far as the gall bladder and stomach were concerned 15 complained of some pain in the gall bladder or stomach or both while 13 complained of still having severe pain at times in the region of the gall bladder or stomach or both.

Conclusions are drawn from 196 cases.

1. The presence or absence of stones in the gall bladder should not be considered in deciding to remove or leave a gall bladder. It is entirely a question of infection.

2. An infected gall bladder had better be removed if there are no contra indications.

3. The location of a stone in the common duct may be a factor in the decision. If it has caused a recent attack of jaundice a possible pancreatitis should be considered and if present the gall bladder should be retained and drained at least temporarily.

4. An acutely inflamed gall bladder due to a virulent infection evidenced by the clinical symptoms had probably better be retained and drained.

Indecisive and mortality investigation table

A cholecystectomy is safer in these cases than a cholecystostomy. A cholecystostomy may be safely done after the acute symptoms have subsided if it is necessary.

The small proportion of gall bladder which contain stones with no present evidence of infection may be drained although it may be safe in these to open the gall bladder remove the stones and leave it without drainage.

6. The general condition of the patient may make a simple cholecystostomy the safer procedure until the general condition improves.

The history is not only the largest element in making the diagnosis but also of great importance in deciding the question of removing or retaining the gall bladder. If the history has no present symptoms indicating chronic infection the gall bladder had better be removed.

8. In spite of these conclusions it takes the highest surgical judgment to decide at times which will give the most ultimate benefit to the patient the retention or removal of his gall bladder.

EDWARD L. COLLINS

Bazy M.: End Results of Entero-biliary Anastomosis (Results of 12 Cases of Entero-biliary Anastomosis). *Bull. Acad. Chir.*, 1906, 5.

Bazy reports two rare operations (1) cholecystoduodenostomy for obstruction of the common duct at the summit of Vater's ampulla (2) cholecystoduodenostomy for obliteration of the terminal portion of the common duct. He has been able to find three similar cases in the literature and little is known of the end results. Two of these cases were reported by Terrier at the French Surgical Congress 1908.

In the two cases reported by the author both patients were women and Bazy has been able to trace their history for sixteen months and eight years respectively after operation. In the latter case the woman became pregnant a little more than a year after operation and was delivered of twins at term without any trouble. In her case the anastomosis has functioned well and at no time during the past eight years has the integrity of the bile passages or the functioning of the kidney been menaced.

In the discussion Brancet mentioned a similar operation in a case where the lower half of the common duct was almost completely obstructed and the upper half was united to the duodenum. One year later there was reappearance of jaundice with other troubles and the patient died.

ALCOCK

Mapes, C. C.: Uncertainties of Understanding Ancient Cholelithiasis. *Am. J. Surg.*, 1906, 54.

The author reaches the following conclusions:

1. That there are many uncertainties of understanding ancient the etiology, histopathology, symptomatology and treatment of cholelithiasis.

2. That the hypothesis that bacterial invasion

represents the terminal rather than the primary factor in cholelithiasis has been clearly disproved.

3 That the medicinal treatment of cholelithiasis is a delusion, there being no drug which internally administered will cause disintegration of definitely formed choleliths.

4 That the most favorable results may be expected to accrue from cholecystostomy cholelithotomy and temporary drainage.

5 That cholecystectomy is illogical and unwarranted except where the cholecyst is already damaged beyond hope of functional restoration or is involved in demonstrable malignancy.

C. G. HEYM

Einborn M. Pancreatic Stone Colic (Zur Klinik der Pankreassteinkolik) *Berl. kl. Wchschr.* 9 6 III, 10.

Pancreatic stones are rarely observed in the human organism and their diagnosis during life is rarer still. Einborn reports two cases which he has had under his observation.

Of the diagnostic signs the occurrence of colic like pain in the epigastric region which is associated with a transient appearance of sugar in the urine is the most characteristic. This pain is periodically repeated and its sudden cessation speaks of the passing off of the stone. The appearance of a stone in the feces consisting chiefly of calcium carbonate without cholesterolin crystals pigment points to its pancreatic origin.

As a general rule the pancreatic function is not disturbed for a long time. Later there are disturbances which lessen the pancreatic activity. While the occasional appearance of sugar in the urine during an attack of colic is very important, it is not a *sine qua non* in the diagnosis of pancreatic stone.

If the ordinary methods of medical treatment fail and attacks are frequently repeated and become more severe in character, operative interference is indicated. The gall bladder and pancreas should be carefully examined and if stone is present it should be removed. Frequently the palpation of small stones even in the exposed pancreas is not possible. The gall bladder should always be drained because much drainage has a favorable effect upon an existing pancreatitis in the case of calculi.

W. A. BRIDGES

Mayo, W. J. The Spleen; Its Association with the Liver and Its Relation to Certain Conditions of the Blood. *J. Am. M. Ass.* 9 6 Ivi, 76.

The regularity with which splenic enlargements and other physical changes occur in association with diseases of the liver and of the blood has strongly impressed the author who, whenever possible during an abdominal section examines the spleen. The examination of this organ by external means is often misleading and can never be relied on, although the X-ray offers some hope in the diagnosis of splenic pathology.

Investigation has shown that not only does the spleen extract bacteria and other toxic agents

from the blood but also preserves the food value of broken down blood by sending their remnants to the liver for further elaboration. But whatever the function of the spleen it must send its products through the portal vein to the liver. This close association will be maintained by the splenic hypertrophy attendant on cirrhosis and secondary liver diseases in the absence of plethoric anemia.

That the liver may not quite fit this function of conservation in the case of the power of regeneration. In all the cases of the body this power is partially lost by hypertrophy taking its place.

Adam points out that in the bacterial infection that have escaped the leucocytes in the blood giving rise to pigmented areas, and laughs at the theory that bacteria resist the action of parasitic organisms, and that disease is a phagocytic and the preventive serum is the cell of the body that resists against the organisms and to so change the body part that they are no longer bacterial food.

Rosenow further demonstrates the selectivity of bacteria and other bacteria for certain tissues or organs. Is it not probable that the spleen has the power of attracting certain substances from the blood as shown by splenic enlargement in typhoid malaria, etc?

Moreover the spleen has no internal secretion as removal does not deprive the body of an important constituent, nor is it under complete nervous control through sensory nerve-fibers from Auerbach's plexus. It does, however contain much striated muscle which is possibly responsible for the digestive rhythmic change in size.

As to the relation of the spleen to blood, normally in the fetus, the spleen liver and nodal and lymphoid structures are blood-producing organs this power in the spleen at birth, diminishing to the production of white cells.

In the various anemias, the spleen acts as a graveyard for the blood-cells, especially the red, not through its own initiative but as though the corpuscles were senescent in some other place and destroyed in the spleen. Thus the enlarged spleens so often found in these conditions may be a work of hypertrophy and it would appear that possibly this excess of splenic tissue or hyperplenism, may cause an unnecessary destruction of the red cells there being many exciting causes for the onset of splenic enlargements, for example the relief of the secondary anemia in syphilis particularly of the liver by the removal of the enlarged spleen.

In so-called primary tuberculosis of the spleen the removal of the organ has occasionally benefited a few. It is likely however that the disease is never primary in the spleen, and such diagnosis is rather the result of insufficient clinical study.

In the anemia of chronic syphilis remarkable improvement followed the removal of the enlarged spleen. In chronic septic conditions with enlarged

spleens removal does not bring satisfactory results as there is usually a very lowered resistance and a cardiorespiratory insufficiency to overcome.

In splenic enlargements associated with hepatic disease it is often impossible to determine whether the process is primary in the spleen or liver. In Hanot's cirrhosis when diagnosed undoubtedly benefit follows removal of the spleen.

In 4 cases the author has removed an enlarged spleen in conditions of portal cirrhosis of the liver with much relief of the symptoms.

It must always be borne in mind that the spleen is only one avenue of entrance to the liver for noxious agents but no matter in what manner hepatic disease occurs there is usually a concomitant splenic enlargement.

The syndrome called splenic anemia the terminal stage of which is known as Banti's disease may be cured in many cases by removal of the spleen.

Cases of stomach hemorrhage in which no other origin can be found should be carefully examined for evidence of splenic anemia as hemorrhage is one of the earliest symptoms in this condition.

In Gaucher's disease described by Brill and Mandelbaum it is the author's experience that splenectomy in the early stages is followed by a cure.

In hemolytic jaundice which is of two types that of Minkowski and that of Hayman and Widal splenectomy gives the most brilliant result.

In pernicious anemia remarkably improvement follows removal of the spleen if done before the spinal cord changes occur.

Preliminary to splenectomy and if not following it blood transfusion is necessary in the majority of cases. The donor's blood should always be tested with that of the recipient for agglutination and hemolysis.

P. M. CHASE.

Wahl, H. R. and Richardson, M. L. A Study of the Lipin Content of a Case of Gaucher's Disease in an Infant. *Am. J. Med.* 96 v. 1 238.

The case on which this study is based was that of an infant eleven months of age with a clinical picture which in general, simulated Gaucher's disease. The spleen, liver and lymph nodes presented the usual changes but the unusual feature of the case was the almost complete substitution of the medulla of both suprarenals by clusters of large pale vacuolated cells. The latter were also present in Peyer's

patches in the intestines and in the thymus besides involving the adventitia of some of the smaller vessels. The process was thus much more diffused than in any case hitherto described and also the first one described in an infant when the condition may be more diffused than when it occurs in adults.

The author made an exhaustive study of the tissues of this case and an extensive review of the literature the following conclusions being drawn.

1. In Gaucher's disease the liver and the spleen show not only a marked increase in the lipin content but also a serious alteration in normal relations of the lipins to each other. The fixed fats are greatly reduced while the lipoids such as lecithin and cholesterol are greatly increased. In the vacuolated leucithin-like body predominated but a cholesterol compound may prevail in other cases.

2. In Gaucher's disease lipoid substances accumulate in the form of small droplets within the cytoplasm of the tissue cells resulting in the formation of a cunulation of the lipin in the large pale cell so characteristic logically of this disease.

3. Gaucher's disease is due to a disturbance of lipoid and fat metabolism resulting in the accumulation of lipoid substances in the cytoplasm of the large pale cells that are mostly transformed reticulo-endothelial cells of the spleen, lymph nodes and bone marrow and the stellate cells of the liver. These cells have the physiologic property of disposing of the fats and lipoids and comprise the endothelial cells of the blood vessels.

4. Those organs that contain the reticulo-endothelial cells in large abundance (spleen, lymph glands, bone marrow, liver, stellate cells of Kupfer, etc.) show the most changes but specific parenchymal cells may absorb some of the lipoid in very advanced cases.

5. Gaucher's disease belongs to the group of xanthelasmic conditions which are characterized by a more or less diffuse accumulation of lipoids in reticulo-endothelial or in fibroblastic cells in one or more organs. It represents a more diffuse and widespread involvement of the endothelial cells than those cases of gross diffuse hyperplasia of the cells in diabetic lipoidemia with an underlying cause that is more deep-seated and inherent in the body economy. (Gruber and E. B. Taylor).

SURGERY OF THE EXTREMITIES

DISEASES OF THE BONES, JOINTS, MUSCLES TENDONS CONDITIONS COMMONLY FOUND IN THE EXTREMITIES

Ashurst, A. P. C. Multiple Cartilaginous Exostoses. *Ann. Surg. Phila.* 90 July 67.

Ehrenfried has recently studied the clinical entity which goes under the name of multiple cartilaginous

exostoses and prefers the name hereditary deformity chondrodysplasia. He was able to find only about a dozen cases which had been reported in America the greatest number of cases being reported from Germany and France. As the author has seen 11 cases within the last ten years he concludes that the disease is not so rare as it seems but that it has been overlooked or ignored.

The underlying pathology is not the exostoses, but a chondrodysplasia affecting especially the metaphyses of the long bones, though the bones of the pelvis, the clavicles, scapulae, and the vertebrae may be involved. The epiphysis is small or misshapen. The intermediary cartilage is narrow irregular, oblique or zigzag and sometimes prematurely ossified. Scattered along the ends of the shaft beneath the periosteum are clumps or nests of cartilage cells persisting uncalcified where they are left in the process of growth. Later these groups may develop into the cartilaginous exostoses, which give the disease its name but these are merely incidental. A malignant osteocartilaginous tumor may develop in one of these exostoses. Certain secondary characteristics usually are present such as low stature due to the shortness of the limbs, particularly the lower. There often is a lack of growth of the ulna and pes valgus is frequent as the result of the lack of growth of the fibula. The disease is transmitted by both affected males and females and by unaffected females but there is no evidence that it may be transmitted through unaffected males.

The author reports cases which he has observed and two others from the service of T. W. which he did not have the opportunity to observe. In addition he reports 5 cases which present no skeletal deformities and evidence of being hereditary but which are examples of some type of chondrodysplasia. CARRAJO

Davidson, A. J. Subungual Exostosis. *Am. J. Orth. Surg.* 9: 50.

The author observed 5 cases of painful enlargement of the distal extremity of the great toe due to subungual exostosis. They were all males under 30 years of age. No history of injury or infection could be obtained. The process requires from six to twenty-four months to develop sufficiently to cause the patient to seek advice.

The etiology of exostoses in general may be summed up as (1) those due to direct infection, (2) those due to direct trauma, (3) those associated with tendon or ligamentous strain, (4) static.

In the cases referred to by the author there was no history of infection of any kind nor were there any inflammatory signs of either the matrix of the nail, the bone or the soft parts. Exostoses of the variety described could not be credited to any associated tendinous or ligamentous strain for the reason that no tendon or ligament is attached to the portion of bone from which the growth arises.

By excluding these possible explanations it brings us to a consideration of trauma. The location of the exostosis is at a point which is frequently the site of trivial injuries and which is being constantly subjected to the continued pressure of the stiff boxing of shoes. The usual atrophic conditions of the flexor muscles of the toes have the effect of increasing the power of the extensors, placing the toes in a position to bear the brunt of this shoe pressure.

Regardless of the fact that no history of direct trauma could be obtained in any of his reported cases, Davidson thinks it is quite possible that subungual exostosis is the result of trivial injuries or occurs following the prolonged irritation of shoe pressure which may or may not be appreciated by the patient. PHILIP LEWIS

Berry, J. M. R. Retarded Ossification as an Etiologic Factor in Traumatic Arthritis and Epiphysitis. *J. Am. M. Ass.* 9: 611 & 68.

Three cases are reported in boys seven to ten years of age. In general the symptoms are the same pain and swelling to the joints of the lower extremity, a slight rise in temperature and some limitation in motion. X-ray examination showed retardation in ossification in the areas involved and also in the wrist.

The cases show that retarded ossification may be an etiologic factor in the production of traumatic arthritis and epiphysitis in children. The trauma in such cases consists in restraint of the joint due to abnormal activity. The child may be leading the normal active life of a child of his own age but anatomically he belongs to a type several years younger and to an old strain his activities should be correspondingly restricted. Cases of this character are probably quite common and very apt to be overlooked or wrongly diagnosed. EDWARD L. C. NELL

Fleux, G. Treatment of Purulent Arthritis of the Knee by Arthrotomy or Marsupialization of the Synovial Sac (Le traitement des arthrites purulentes du genou par l'arthrotomie ou marsupialisation de la synoviale). *Pres. Méd.* 9: 6.

Fleux affirms that in injuries of the knee joint one of the factors which engenders rapidity of suppurative diffusion is the difficulty of drainage or rather inefficiency of evacuation with drainage. According to Delore and Kocher arthrotomy for drainage is a blind method which is often insufficient.

Fleux has observed in the wounded cases under his care that there was retention of pus in the serous cavity in spite of the presence of several large permeable drains. From close observation he came to the conclusion that it was the drain itself that formed the obstacle to drainage. He therefore replaced arthrotomy with drainage by arthostomy, creating one or more articular mouths kept wide open which allowed the continuous evacuation of the infected joint contents without the aid of any tube. He gives the details of seven cases treated in this manner.

This method of evacuation of the knee-joint in no way obviates the indications for resection of the knee which have recently been formulated by Tuffier and others but it is incontestable that the more quickly and better septic products are evacuated from the synovial spaces, the less the indications are for resection. This is why he thinks that arthros-

tomy is superior to arthrotomy incisions with drainage tubes
W A B 1900

Dunlop J A Deposit in the Supraspinatus Muscle
Simulating Subacromial Bursitis *Am J Orth Surg* 9: 10

The author reports a case of a large deposit about the tendon of the supraspinatus as well as a considerable deposit in the belly of the muscle demonstrated by tercoröntgenogram.

The treatment instituted was a plaster cast such as is used in the abduction position for fracture of the neck of the humerus. This was applied under nitrous oxide anesthesia. After ten days the cast was removed and the support and position were gradually done away with. Hot air bakes are useful in such cases in relieving pain and hastening the return of normal motion.

PHIL LEWIS

FRACTURES AND DISLOCATIONS

Hiltzot J M and Bolling R W: Fractures of the Neck of the Scapula *Ann Surg Phil* 9: 6 Jul 5

Fractures of the neck of the scapula with or without involvement of the glenoid fossa while not common have been found to be of more frequent occurrence since the advent of the X-ray. These fractures fall into the following groups:

1 Fractures of the surgical neck of the scapula.

Fractures of the lower half of the neck of the scapula.

3 Fractures of the neck of the scapula beginning at the neck and extending downward through the base of the coracoid process to the glenoid fossa.

4 Fracture of the anatomical neck.

5 Stable fractures of the glenoid fossa of the scapula.

6 Fracture of the rim of the glenoid with or without fissure running into the neck. This type is frequent in fixation of the shoulder and as they occur with complicating injuries of dislocations the authors have not included them in their review of the literature.

There is no authentic case of the fourth type recorded in the literature.

The authors report nine cases and the results of some experiments upon the cadaver. From their observations they conclude that the description of the deformity resulting from fracture of the region of the neck of the scapula as ordinarily given is not correct and that the fracture in this region may occur without any recognizable deformity. They believe that the clinical manifestations of the fracture are insufficient to make a positive diagnosis and that the X-ray is an essential factor in the diagnosis. The immobilization of the arm by a Velpau or similar bandage is all that is necessary in the way of treatment and manipulative efforts have no effect upon the displacement which occurs at the line of fracture. By massage baking and careful

after treatment practically perfect functional result will be obtained. Should the type of fracture occur in which the ligament is totally torn, the bony fragments will be felt behind and the glenoid fragment displaced into position with reference to the joint injuries by appropriate methods of repair of the ligament etc. Including these cases reported by the authors there are only about thirty cases in the literature in which the diagnosis has been confirmed by X-ray and autopsy.

(VET 1900)

Roberts, J B. The Artificial Periosteum for Fixation of Shaft Fractures. *J Surg Phil* 9: 11 5

Although the author has not changed his views in regard to the method of treating the great majority of fractures he advocates the use of an artificial periosteum in certain cases in which there is a minute incision for an open operation. Instead of the woven nitroglycerin suggested by Dr C. Strauss the author suggests the use of an autogenous graft of fascia. He states that the use of fascia may be applied for the various types of fracture for instance two narrow splints may be wrapped about the bone a considerable distance from a fracture in case of a compound fracture or a wider band where the fracture is more transverse. The object of the fascial tube is to make an artificial periosteum which will act as an absorbable support for shaft fractures. The author has not demonstrated the efficiency of such a method of fracture treatment either by experimental work or by actual use in suitable cases.

(VET 1900)

McGlannan A. Fracture of the Neck of the Femur: A Study of the Treatment and Final Results of 85 Cases. *N Y G* 16: 11 5

The author reports a case of fracture of the neck of the femur that has come under his personal observation in the past eight years. In this series 36 recent fractures and old fractures were treated and 12 patients were not treated.

In all cases full abduction with downward traction and inward rotation was the position obtained in the reduction of the fracture. The full abduction was assured by fixation of the pelvis by abducting the sound leg and the inward rotation by lifting the trochanter forward. Impaction was separated in 6 cases and in the seventh was not disturbed because the impaction occurred with abduction of the thigh. This is an unique observation.

Various forms of fixation were used from bism plaster of Paris cast to loose tying out of the thighs. Direct extension by ice tongs was used in 3 hand-capped patients one of whom died. Nailing the fracture was done twice.

For the old cases bone graft was used once, nailing twice, removal of head once, subtrochanteric osteotomy twice, freshening fragments once.

Of the recent cases four died and in one the fracture failed to unite. One of the old cases resulted fatally and the patient still walks on crutches 7 years after treatment.

Treatment was refused by young adults, with vicious union. Ten patients were not treated on account of feebleness and circulatory pulmonary renal or nervous symptoms. Two are living several years after the injury aged 88 and 90 years, respectively. Delirium tremens and evidence of drug addiction or uræmic manifestations make the prognosis grave. Loss of control of bladder rectum seems to indicate an inability to stand fixation. The effect of the healed fracture on earning capacity is noted in 20 cases, the average loss being 5 per cent, after a period of disability lasting from 6 months to 1 year and 3 months with an average close to 1 year. The occupation of these patients included hotel manager, restaurant owner, housekeeper, seamstress, laborer, tailor, motorman and market driver.

SURGERY OF THE BONES, JOINTS, ETC.

Burckhardt H., and Landolt, F. Experiences in the Treatment of Infected Joints in War (*Erfahrungen ueber die Behandlung der Gelenke im Kriege*). *Berlin* 11 (1915) 358.

The authors have reported their methods in a previous communication but were then unable to report on the end results. They now report these

end results and are able to state their conclusions on more definite basis. This study is a contribution to the question whether resection of a joint is justifiable in war or not.

In all severe cases of joint infection, the indications alone must decide whether resection or amputation is to be resorted to. Resection is generally done (1) in the field hospital as part of the immediate treatment of the wound (2) later on on some vital indication when amputation is voided (3) after a longer period when it is thought to effect healing of a chronic joint suppuration.

The most important and the most frequently observed cases of joint infection are those of the knee-joint, which when badly infected are almost impossible to save. In the hip-joint infection as regards relation to life and function. If the fissures extend well into the ilium amputation is the best method, but if amputation is not do then radical resection with ablation of the bone end is preferable to simpler procedures.

Regarding individual joints resection in the case of the hand, foot and elbow joints gives good result. In the case of the knee-joint resection is indicated if the general result is good and there is only a moderate amount of bone destruction and if subsequently long treatment of the patient in place can be assured. But the general results are poor and although the limb is preserved pseudarthrosis usually results. Nevertheless, resection or at least some simpler operation should be tried

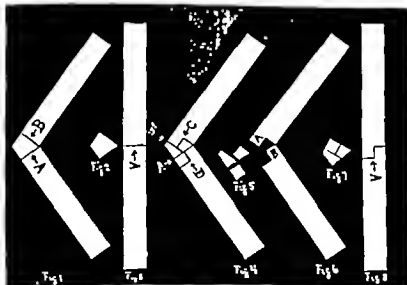


Fig. 1. Cuneiform osteotomy showing lines of section at A and B.

Fig. 2. Wedge removed in cuneiform osteotomy.

Fig. 3. Bone straightened after cuneiform osteotomy showing transverse joint at A.

Fig. 4. New operation. Lines of section at A, B, C, D.

Fig. 5. Fragments removed in new operation.

Fig. 6. Shape of bone ends after removal of fragments.

Fig. 7. Rearrangement of removed fragments. Note that combined they correspond exactly in size and shape to the edges shown in Fig. 6.

Fig. 8. Bone straightened after new operation, showing overlapping joint at A. Note that the length of the bone is exactly the same as in Fig. 3 (Hoffman).

when the above conditions are present. If they are not, then amputation must be done to save the patient's life.

In the shoulder joint resection gives better results. In infected hip-joints the casualties are very great and resection very rarely saves the life of the patient.

W. A. BRIDGES.

Hoffman, P. An Overlapping Joint as a Substitute for Cuneiform Osteotomy. *Am. J. Orth. Surg.* 9: 111, 1915.

The author devised an operation that substitutes for the simple transverse joint made in the cuneiform section an overlapping one that is less liable to displacement. There is an underlying simple general plan that involves two linear cuts and the removal of two corners of bone, no matter what the degree of angulation.

The first cut is perpendicular to the long axis of one of the arms of the deformed bone on a level with the apex of the angle on the concave side of the bend. This divides the bone into a longer and a shorter segment.

The second cut is made perpendicular to the long axis of the longer segment on a plane parallel with but distal to the cut that would have been made in a cuneiform osteotomy. The more distal this plane the longer will be the overlapping tongue of the resulting joint.

Next the end of the longer segment is turned out from the skin incision and a corner is removed from its deeper side. The longitudinal cut should be parallel to the long axis of the segment and should divide the bone equally. The transverse cut should be on a level with what was the apex of the

angle on the concave side of the deformity. The longer segment is turned out from the skin incision and a corner is removed from its deeper side. The two corner buds are then brought together and the bone is united the same as after a fracture operation.

A bone union is secured. All healing is made with an ordinary plaster cast. The medial fragment responds in size and shape to the medial half of the original bone and the lateral fragment responds in size and shape to the lateral half of the original bone.

Kane, E. O. Preliminary Report on Device for Intramedullary Fracture Splinting. *J. Surg.* 3: 3, 1915.

An expanding screw is used to replace the bone. It is recommended to replace the bone with a screw. After clearing the medullary canal, the screw is drilled to the length of the fracture. The screw is then expanded by turning the handle. The screw expands, filling the cavity tightly and holding the fracture firmly.

This method provides sufficient support without traction or angulation of the opposing fragments. Yet a splint holds the length of the usual peg

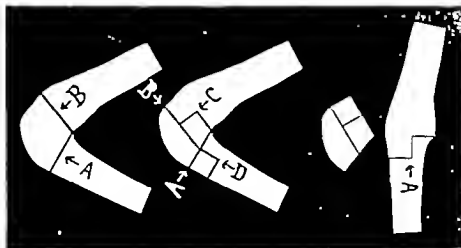


Fig. 9

Fig. 9. Tracing of diorphan showing cuts A and B that would have been necessary for a cuneiform osteotomy and the resulting wedge fragment.

Fig. 10. Tracing of radiograph showing A, B, C, D, all made in the thoracic operation and the resulting fragment removed.

Fig. 10

Fig. 11. Rearrangement of removed fragments. Note that combined they correspond in size and shape to the wedge shown in Fig. 9.

Fig. 12. Bone brought back after operation. The overlapping joint is A. H. H. H.

Fig. 11

Fig. 12

can be inserted consequently a very blue fracture is held as accurately in position as if it were transverse. The thumb is disturbed but slightly the technique is simple, the procedure rapid. The hollow cylinder permits new medullary and bone formation, and being of the thickness of a paper (two-thousandths of an inch in thickness) the steel can corrode away.

Chaput Resection of Almost the Whole of the Humerus for Fistulous Osteomyelitis, Followed by Osseous Reproduction Without Shortening and with the Production of a New Humeral Head (Resection de la presque totalité de l'humerus pour ostéomyélite fistuleuse suivie de reproduction osseuse sans raccourcissement avec production d'une tête humérale nouvelle) *Bull. et mém. Soc. d' chir. d' Par.* 9 6, xll, 433

The author reports a case of multifistulous osteomyelitis in a boy of 16. In February 1914 Chaput resected from 2 to 25 cm. of the lower part of the humerus. Later on in May 1914, owing to the development of a fistula the upper third of the humerus comprising the articular extremity was ablated. Cicatrization occurred in from two to three months the bone reproduced and united with the new bone of the lower region.

This reproduction of almost the entire humerus Chaput explains as being due to the preservation of the periosteum and the youth of the patient. Up to the twentieth year the regenerative power of periosteum is very active. After thirty grafts are indispensable.

The continued use of extension in this case prevented shortening. The reproduction of the humeral head is very interesting. It has only been possible owing to the abundant formation of bone which has been facilitated by movement. W. A. B. RICE

Albee F. H. A Statistical Study of 519 Cases of Pott's Disease Treated by Bone-Graft. *Am. J. Orth. Surg.* 9 6, d, 34

With the object of securing a report of results obtained by others with the bone-graft treatment of Pott's disease a large number of printed questions were sent to surgeons in this and foreign countries who had performed this operation.

Thirty-three surgeons reported a total of 599 results in 229 of which the disease was pronounced arrested in 59 the condition was improved. Of the 599 patients 12 died, 4 of these fatalities being reported as due to shock. The remaining 5 cases died four months or longer after the operation, either from complications or from intercurrent disease. In 5 of these cases the symptoms from spinal disease were entirely controlled. In 3 of the 4 cases in which death was due to shock, the chisel and mallet were used to obtain the grafts.

Of the 33 surgeons 16 reported 100 per cent of the cases as arrested, 9 reported that they did not use plaster jackets or spinal support beyond the period of immediate post-operative recum-

bency, 9 reported 100 per cent of cases arrested and one secured 83 per cent of good results.

Of the author's personal cases only those that have been operated upon one year or longer are included in this report. There are 98 of these in 184 the disease was arrested, in there was improvement. To date 2 died 6 of these were entirely relieved of their Pott's disease symptoms and died of some intercurrent disease.

One case died of an unknown cause the day after operation one died of tetanus on the fourth day one from status lymphaticus, one died two years after operation from suppurative meningitis following a skull injury. Autopsy showed complete cure of the tubercular spine. One died of pneumonia one week after operation. Others died of amyloid degeneration of the viscera, tuberculosis of the lungs, and an acute abdominal condition. Only 3 of the 539 cases have died of tuberculous meningitis. In no case has there been any trouble with the ilium from which the graft was removed.

The ages of the patients varied from 20 months to 65 years. Of the total 539 cases the disease was arrested in 460 the disease was improved in 59 in 20 improved. There were 9 deaths after operation. In 6 instances death occurred long after operation and after all spinal symptoms were entirely relieved.

The author concludes his interesting paper by stating that every diagnosis of Pott's disease should be confirmed by X-ray examination which should include anteroposterior view as well as a lateral oblique lateral. The disintegration and crumbling of the vertebral bodies is always demonstrated before reaching the operation. This is necessary to confirm the diagnosis but it is most practical to determine the number and the part of the vertebra involved so that the graft can be correctly placed. PAUL L. LEE

M. Williams, C. A. Homoplastic Transplantation of a Bored Segment of a Radius. *Int. Surg. Phila.* 9 6, l, 85

Brewer in January 1910 transplanted a radius from a white into the arm of a patient operated upon a few days previously for sarcoma of the radius, in whom it had been found necessary to remove the lower two and three-eighths inches of the bone. The transplant was boiled for an hour and kept in formal salt solution for four days. Primary union occurred without any subsequent discharge.

The author reports the Brewer case as an example of a homoplastic transplant which has been at least partially successful. From the present roentgenogram it appears that the portion of the graft nearest to the living bone has regenerated completely. It has been entirely substituted so that further away has been only replaced, while the free end was entirely absorbed. The author believes that an autogenous transplant would have given better results. He concludes that dead bone merely acts

as a conductor in that it homoplastic transplantation are employed at all they should be taken from living individual and transplanted with the periosteum. The uses of a homoplastic transplant will depend upon the serological relations but even the individual from whom the graft is taken and the one into whom it is to be grafted. The case is of interest on account of the extreme rarity of reports of successful homoplastic transplantation. In conclusion the author gives a summary of the cases of living and dead homoplastic bone transplantsations in the literature between thirty and forty cases in all. (C. W. WOOD)

Freiberg, A. H. Tendon Transplantation in Infantile Paralysis. *Lancet* 1916 916

Tendon transplantation is a measure of utmost value in paralysis following anterior poliomyelitis but the end results have not yet shown unqualified success. Primary results have been attractive but the corrections have often been only temporary. The failures have been due to various surgical and mechanical additions. Successful transplantation requires (1) The transplant must bear a fairly close morphological and functional relationship to the muscle whose function it is to supplant. (2) The transplant must be fastened to it in a point of insertion and physiological tension only. (3) The transplanted muscle must not be used to hold the limb in a corrected position.

Freiberg describes his operation for paralytic equinovarus. He divides the Achilles tendon and taking the *extensor digitorum longus* passes it through the same compartment in the annular ligament with the tibialis anticus and sews it to the peroneum in company with the insertion of the tibialis anticus. Thus the insertion and insertion of the *extensor digitorum longus* practically identical. Freiberg emphasizes the necessity for little and simple operative plans and condemns the attempts at converting flexor into extensor.

In the treatment of infantile paralysis during the first year mechanical support must be used to protect the paralyzed muscles from overstretching, also muscle training massage and local heat should be used but by no means any form of electricity. Only after a long period should any operative procedure be considered. (R. G. PICKARD)

Ryerson, F. W. Deformities Due to Infantile Paralysis. Operative Treatment. *Am. J. Orth. Surg.* 1916 4 59

While it is undoubtedly true that some cases are best treated by apparatus it is especially effective in flail knee-joints where both the flexors and extensors are paralyzed and the best treatment is a brace with a lock joint. If a single hip-joint is flail arthrodosis is best if both hips are flail apparatus is a necessity. With these exceptions practically all other leg and foot deformities and weaknesses can be treated better by operation than by apparatus.

The practice of repeated tenotomy and trussing is to be strongly condemned. Where any reasonable operative procedure can free the patient from the need of apparatus it should be used. No radical operation should be performed until at least two years have elapsed after the attack of intertrigular myelitis. During this time an attempt should be made to favor the return of power to all unparalyzed muscles. Distortions should be prevented if possible by apparatus such as braces or plaster flaps. The patient should be compelled to use the weak muscles. Electricity, massage, inhalation and cold water should be used to stimulate the nutrition of the muscles. If at the end of two years the condition is not satisfactory a thorough anatomical examination should be made to determine what can be done by operation.

Torrey and Ryerson recommend either splitting or lengthening the tendo achillis if short by Ray's tenotomy. If the extensors of the toes are active they may be fastened to the metatarsal bases preferably by passing each through a hole drilled in its respective bone or by splitting the periosteum gouging out a groove in the bone and sewing the tendon into the groove beneath the peroneum.

For paralysis of toe extensors as well as of the tibialis anticus one or both of the peronei may be displaced forward in front of the malleolus and sewed to the scaphoid or middle cuneiform. If the tibialis posterior be a flail it may also be displaced forward like the peronei and may be needed to check the tendency to valgus. In simple drop-foot a cell as in varus or valgus distal to the astragaloscaphoid arthrodosis should always be performed by firmly sewing the bones with a vertical bichloride silk or kangaroo tendon sutures. In 15 cases where the author has split the gastrocnemius and passed one half of it forward to act as a dorsiflexor of the foot he failed to obtain active function although it acted as a good check ligament.

He recommends Gillis's operation to control the equinus but in his experience of 5 cases it repeatedly failed to prevent lateral deviation. He says it should invariably be supplemented by arthrodesis of the astragaloscaphoid joint or by taking a strip of periosteum and bone from the tibia and implanting it in a groove cut along the inner side of the astragalus, the internal cuneiform and the first metatarsal bones.

Heavy bichloride silk ligament from a hole drilled in the tibia running down under the annular ligament to the inner and outer metatarsal bones gives excellent results where there is no lateral deformity. It should be combined with astragaloscaphoid arthrodosis.

For pes calcaneus Whitman's operation is the best. For paralysis of the extensor quadratus of the thigh the author strongly recommends the transplantation of a healthy biceps and semitendinosus forward into the patella. In contractures of the tensor fascia lata and other structures around the

hip the subperiosteal method of Souttar is excellent
 PHILIP LEWIS

ORTHOPEDICS IN GENERAL

Cornier, E. M. Deformities of the Feet. *Cl. J.*
 9 6 21 93

The author discusses various deformities of the feet from the standpoint of the normal positions and movements of the foot. Deformities are variations from these normal conditions. The foot rests normally in a position of moderate calcaneus while the active foot is in a position of talipes equinus. At the ankle joint the movements of dorsal and plantar flexion of the foot occur at the malleolar joint abduction and adduction occur. Pes planus is a deformity of abduction and pes cavus is one of adduction. Abduction causes a depression of the normal arch of the foot but paradoxical as it may seem some persons have all the symptoms of flatness of the foot but nevertheless have an arched instep. By means of diagrams he shows the occurrence of callosities on the soles of the feet which are caused by the assumption of these varied positions, thus the abducted foot has its typical localized callosities, the adducted its own, etc. The deformities of the active foot, talipes equinus and pes cavus, usually cause few symptoms, but the deformities of the inactive foot talipes calcaneus and pes planus, require treatment.

At the metatarsophalangeal joints, he describes the deformity of hallu rigidus which in the active position develops into hallu extensus and in the inactive position, into hallu flexus. These are caused by bony development on the dorsal or under surfaces of the head of the metatarsal bone. If they grow out laterally they produce hallu valgus or hallu varus depending upon the side they grow upon. The treatment is the operative removal of these bony outgrowths, with the wearing of properly shaped boots.
 R. S. BROWN

Lovett, R. W. The Superstition of Flat Foot.
Pediatrics 9 6 xxviii, 6.

From a study of the feet of 800 nurses the author concludes that the troubles ordinarily described as flat-foot, "pronated-foot," and "weak foot" are not due to any particular type of structure of foot. A foot with a high arch was found to be slightly less enduring than the low-arch type. He concluded that the trouble was due to muscular strain. Frequently the arch of the sole of the foot is not so high as the arch of the foot and this is apt to cause strain.

Painful rigid flat-foot should be treated by manipulation under ether or by operation. Painful flexible flat-foot or foot strain will require the temporary use of a support. The arch of the sole of the shoe should also be raised sufficiently to support the arch of the foot.
 I. BARNES

Schmidt, M. Congenital and Especially Bilateral Elevation of the Scapula (Ueber den angeborenen nasbendern doppelte Schult. rblatthoch stand) *Zschr. f. orthop. Chir.* 9 xxxv Mar

There are 6 cases in the literature of bilateral elevation of the scapula. Various theories have been offered as to the cause of the deformity: lack of amniotic fluid, exostoses, muscular defect, intruterine poliomyelitis, and malformation of the scapula, also the arrest of the normal descensus of the shoulder-blade.

The technique of the operation which was performed by V. Iplius is as follows: Incision along the spine of the scapula directly to the bone elevation of the periosteum and entire resection of the bony part of the fossa suprascapularis. This part of the scapula appears to be bent forward on the shoulder. The median part of the scapula and an exostosis arising from the median border into the depth are also resected. Then subcutaneous tenotomy of the tendons of the posterior axilla is performed. A plaster-of-Paris dressing in abduction is applied and left on for four weeks followed by massage. Orthopedic gymnastics are of prime importance in the after-treatment of the deformity. In the case described the elevation of the arm was increased from 85 to 88 degrees.
 A. STERN

O'Reilly, A. Results of Non-operative Treatment of Infantile Paralysis. *Am. J. Orth. Surg.* 9 11 43

The author's paper is based on a study of the cases of infantile paralysis treated at the out-patient clinic of the St. Louis Children's Hospital and the Washington University Medical School. The majority of cases seen were paralytic of the lower extremity. The muscles are put in equilibrium and all strain is removed from the weak or paralyzed muscles. In the majority of cases, brace is applied. Originally the brace was attached to the shoe. In the past two years sandals have been used. Any deformity due to contractures which does not yield to stretching is corrected by tenotomies.

The patients come to the clinic three days a week for massage and muscle training and the mothers are instructed how to massage them on the other days.

From an analysis of 14 cases treated the author concludes that it is very difficult to treat infantile paralysis non-operatively in an out-patient clinic owing to the difficulty of inducing the patient to attend regularly for any length of time.

From 40 to 45 per cent of the cases show some improvement when treated by braces and this percentage is not materially increased by the use of massage. Improvement in all cases in which it was used was not great and recovery of muscle power in stretched and exhausted muscles seems to be slight. In the majority of cases an improvement took place after six months especially in the more severe cases. He believes that it is safe in operating on any case of infantile paralysis after the first year and that it should be done in suitable cases.
 PHILIP LEWIS

SURGERY OF THE SPINAL COLUMN AND CORD

Cates, B. B. Spina Bifida. *B. N. M.* — 3 J
915 cl. XIV 230

The author reports 9 cases of spina bifida coming under his care making in all 16 cases which he has treated. The ages varied from 21 days to 12 years though with the exception of 2 the ages averaged about eight weeks. The history of each is given in full. Of the author's 16 cases 10 survived beyond a post-operative period of three months. He believes that the age of the patient is not an important factor in determining the personal equation as the physical condition and believes the surgeon may with a clear conscience urge the lesser of two evils operation under the most favorable conditions rather than rupture with risk of infection and meningitis. F. M. C. R. MESSICK

Rugh, J. T. Bone-Grafting for Spinal Conditions. Report of Forty Cases. *Am. J. Orth.* — 18
9 6

The author claims six advantages for the bone-grafting operation viz:

1. It accomplishes fixation in less than a year in marked contrast to the four to ten years required by other methods.

2. Under this fixation treatment nature will more rapidly fill in or solidify the diseased area.

3. An abscess formed or in the process of formation will usually disappear without tapping or opening.

4. Very low mortality.

5. Manipulations are all done in normal healthy tissues in the vast majority of cases.

6. The economic advantage which in the case of the wage earner makes him an independent member of the community within a year.

In his experience with forty cases Rugh has found no disadvantages that can be attributed to the operation *per se*.

He believes that the operative fixation of the spine is the treatment of choice for spinal caries and certain other conditions and especially so in cases past 12 or 14 years of age. He reports a series of forty operations with 74.3 per cent of excellent results and Lange's requirements were fulfilled in that he placed the brace under the skin and shortened the time of efficient recovery.

PHILIP LEWIN

Claude, H. and L. Hermitte, J. Anatomical Study of a Case of Total Section of the Spinal Cord. (*Etude anatomique d'un cas de section totale de la moelle*). *Bull. Soc. med. d. hop. d. Par.* — 9 6 xviii 476

The authors consider that the case now reported upon by them presents a double interest inasmuch as it shows unusual clinical expressions of total section of the spinal cord and that it permits of

localizing the origin of certain reflexes which up to now have been matters of discussion.

There is no certain symptom which allows the diagnosis of total section of the spinal cord while some patients exhibit all the classical symptoms yet anatomical examination proves that the medullary axis is preserved in its continuity. The case now presented while showing unusual features all has this diagnosis and also indicates how certain traits must be interpreted.

The patient was a soldier who in consequence of injuries presented a vertebral fracture with a very marked gibbosity in the region of the eighth dorsal apophysis. Examination 10 days after the injury showed complete anesthesia as far as the eleventh dorsal root complete abolition of the reflex and achillean reflexes and of the lower abdominal reflexes inversion of the plantar cutaneous reflex absolute retention of urine relaxation of the anal sphincter etc. Forty-eight days after the injury there was a reappearance of the tendon reflexes which were exaggerated. Eight days later defensive movements of the lower limbs were noted and within a few weeks more there were automatic movements of the limbs. These movements were preserved up to the time of the patient's death which occurred four and one half months after the injury.

The reappearance of the automatic movement suggested a very severe compression rather than a total section of the cord and surgical interference was suggested but refused by the patient.

Autopsy clearly showed that there was a fracture of the dorsal vertebra the spinal cord was not only compressed but literally crushed thus crushing corresponding to a total section. There was complete isolation of the lumbar and dorsal cord as well as of the encephalic connections.

The authors observe that their findings show that while in the majority of cases of total section there is a flaccid paraplegia with muscular hypotonus and abolition of tendon reflexes yet sometimes after such symptoms there may be clinically a restoration of certain tendon reflexes even an exaggeration of them and an increase of reflexes of leucase and of spontaneous movement. The phenomena displayed by the author's patient was in contradiction to the law of Jackson-Bastian according to which every complete section of the cord is accompanied by an absolute anesthesia and a flaccid paraplegia with total abolition of the tendinous reflexes.

The authors account for the exaggerated tendon reflexes by the compression of the lower trunk of the cord owing to the presence of an anterior dura mater nodule. This slight compression by increasing the dynamism of the gray matter seems to be the most old cause of the tendinous hyperreflexivity. As regards the defensive movement the authors agree with Mori, Loix and Dejerine that these are due to medullary automatism.

In further considering the phenomena observed in their case, the authors observe that the preservation of the spinal vessels assured the lower segment a better nutrition than in cases where the isolated segment is deprived of all vascular connection with the encephalic segment. Moreover in their case the circulation of the cephalorachidian liquid was not sensibly disturbed, and as a consequence there was no interference with the osmotic phenomena of the nerve-cells through the pericellular and perivascular lymphatic spaces. W. A. BRIDGES

Jonas, A. F. Dislocation of the First Cervical Vertebra Produced by Manipulation. T. Am. Surg. Ass. Washington, p 6 May

The author reports one case which is made the subject of his paper. The patient was a farmer who appeared for examination in August 1915 with his head dropped forward, face partly turned toward the right side, and his chin resting on his sternum. His eyebrows were highly elevated. His neck seemed to be fixed for he did not make the slightest cervical rotation. A lateral view disclosed the posterior end of the cervical region projecting sharply backward on the occiput. His appearance suggested destructive cervical spondylitis or an occipito-cervical neoplasm. He spoke with difficulty for he could separate his jaw only to a very limited extent.

He stated that he had not been able to turn nor raise his head for more than a year and that his condition was due to manipulations received at the hands of an osteopath while under treatment for generalized rheumatism. He had been placed on an operating table and the treatment was begun with vigorous and forcible rotations of the head. The operator standing at the head of the table had grasped the patient's head with both hands one resting on either side of it, two fingers, the index and middle beneath each horizontal mandibular ramus, and while holding it thus, his head was twisted from side to side by extreme and forcible rotations, causing great pain. He suddenly felt and heard a loud painful snap in the back of his neck at the base of the skull and his head became fixed in the position described and had so remained. He stated that his condition had become unbearable on account of the pain in the back of the neck and occiput and his inability to separate his jaws enough to enable him to eat speak with freedom. He had had an almost constant vertical headache as well as pain in the neck since the accident.

On examination any attempt to rotate his head caused a marked muscular spasm involving all the cervical muscles especially the trapezi and sternocleidomastoids. An osseous projection was not only palpable but distinctly visible in the occipitocervical space. This appeared to be a spinous process belonging either to the first or second cervical vertebra. The tip of the spine appeared to deviate to the left of the median line. It was tender on pressure and caused the patient to flinch decidedly. In-

spection and palpation of the pharynx disclosed an irregularity and tenderness at the nasopharyngeal junction.

It was evident that it was a case of luxated cervical vertebra, probably the first one of the atlas. There had been no cord pressure symptom except for an occasional tingling of short duration in both arms and hands. There had been no motor disturbances all reflexes were normal and careful search for sensory changes was negative. A skiagram presenting lateral view of the cervical spine revealed a retrodisplacement of the atlas. The space between the posterior margin of the foramen magnum and the first cervical spine was clearly increased. The condition was not clear on first inspection owing to the fact that the spine of the second cervical vertebra is much larger and longer under normal conditions than that of the first the latter usually being absent or rudimentary. Further a dislocation at this point without a fracture of transverse or articular process of the axis and absence of cord lesion is improbable. Therefore, it was evident that there was a slipping forward of the head on the atlas involving the occipito-atlantal articulation. The occipital condyle, probably the left one, had slipped forward so that it rested in front of the margin of the left superior articular surface of the atlas causing a fixed rotary anterolateral deviation of the head. The patient was informed of his condition and advised to return to the osteopath as this class of practitioners never consult themselves as per bone-setters. He declined as a rigorous English his wet would permit and insisted that the author make manual lucio. He was informed that this was out of the question because one could not hope to reduce dislocation in this region that had existed more than a year in which he hoped for an accidental readjustment and at the same time did an injury to the medulla. It was agreed that an effort to make reduction should be made and if unsuccessful immediate open operation should be done.

A cordingly and complete eth anesthesia, guarded rotary manipulations with pressure over the prominent cervical spine were carried out and as was expected without results. The patient was placed in the ventral position and brought forward on the operating table so that his shoulders rested on its edge and the forehead was placed on a Cushing bench. A laminectomy had been planned because it was considered impossible to effect safe operative replacement of the dislocated atlas after having been displaced for more than a year. The chief object to be achieved was to remove the inferior articular surface as well as the lamina to enable the patient to elevate his head so as to relieve the pressure of the chin on the chest. Through the usual posterior incision the arch of the atlas together with the left superior articular surface was removed with a rongeur forceps. A distinct anteroposterior movement of the head could not yet be made. The right atlanto-occipital articulation was affected only in a rotary

way and as its articular surfaces were in contact and immovable it was difficult to move enough to the articulation to mobilize it. This was accomplished so that anteroposterior movement became fairly good. The wound was closed and dressed in the usual aseptic manner. The operative recovery was normal. The immediate operative result was

perfect in the raising of the head so that the humerus was in the position of the patient's hand. The patient could pick up the head with the hand. The patient was able to pick up the head with the hand. The patient was able to pick up the head with the hand.

SURGERY OF THE NERVOUS SYSTEM

Cosset A. Complete Section of Left Radial Nerve—Suture—Return of Voluntary Movement After 150 Days. See *Plat. J. N. Rad. I. Gau. h. s. ture ne. se. t. l. m. s. men. s. d. voluntary ap. ro. ju. B. P. I. M. m. s. d. ch. d. Pa. J. t. l. u. s. 4.*

Cosset gives the details of a case of left radial paralysis operated upon by him in February 1905 in which total section of the nerve was found in the nerve sutured. Five months later there was return of voluntary movements. He refers to two similar cases previously reported by him. *W. A. B. W.*

Monnington. In Laceration of the Radial Nerve in a Cicatrix—Total Radial Paralysis—Liberation of the Nerve—Immediate Reappearance of Motion and Sensation. See *Plat. J. N. Rad. I. Gau. h. s. ture ne. se. t. l. m. s. men. s. d. voluntary ap. ro. ju. B. P. I. M. m. s. d. ch. d. Pa. J. t. l. u. s. 4.*

In the great majority of cases the results of operative intervention in lesions of the nerves have had but a temporary success and it is only after a long interval that one can be sure of a favorable result. Lesions of this kind may be divided into two classes: those in which there is complete section necessitating suture and those in which the continuity of the nerve is merely disturbed and its physiological functioning prevented, which only requires freeing of the nerve.

In the first class of nerve suturing favorable results are exceptional. In 10 interventions Walther had 10 cases of complete or incomplete nerve section in which he was unable to note any favorable result after four months. Tuffier and Dumas stated that in 10 nerve-sutures done by them there was no recovery. The results obtained in freeing nerves and re-establishing continuity are very different. Walther's statistics show a perfect complete recovery.

Monnington reports a case of a man wounded in the left arm followed by paralysis and almost complete loss of sensation. Intervention was made 65 days later. The radial nerve was found embedded in the cicatrix and freed. In less than 8 days there was a disappearance of the paralysis and a complete restoration of sensation.

Kernig's who ulcers this report of M. A. Sangren on the same case who became under

his own observation here after it was with right humerus there was a right radial palsy. The reason on the cicatrix which occurred at the point where the radial nerve passed through the axillary edge of the humerus was found. After incision the nerve was freed and sutured. At the time of reporting it was only 1 month after the patient was entirely well. *W. A. B. W.*

Rogers, M. H. An Operation for the Correction of the Deformity Due to Obstetrical Paralysis. See *Plat. J. N. Rad. I. Gau. h. s. ture ne. se. t. l. m. s. men. s. d. voluntary ap. ro. ju. B. P. I. M. m. s. d. ch. d. Pa. J. t. l. u. s. 4.*

In the deformity the anterior ulnae of the arm and the arm are rotated inward. The patient is unable to attempt to raise this deformity by doing a osteotomy of the upper portion of the humerus about six inches below the humeral joint. It will be by a one-quarter rotation of the humeral arm, the line of rotation. An incision made between the muscles of the arm and the ulnae that there is no nerve involvement. *J. H. A. L.*

Edinger L. The Uniting of Divided Nerves. See *Plat. J. N. Rad. I. Gau. h. s. ture ne. se. t. l. m. s. men. s. d. voluntary ap. ro. ju. B. P. I. M. m. s. d. ch. d. Pa. J. t. l. u. s. 4.*

Edinger has found that there is often great difficulty in the union of the ends of severed nerves. The regenerated nerve fibers which are thrown out by the ganglia will can easily be diverted from their course by any mechanical obstruction such as a blood-clot and union between the stump at therefore be prevented. He shows that this is the case by his own observation and those of others whom he quotes.

The only way that the regenerated fibers may be kept in the proper direction to effect union is to permit them to grow in a tube. Nevertheless the attempts made to grow nerve tubes in tubes of previous workers did not give good results because it was necessary for the fibers to be surrounded in the tube by a suitable environment for growth. Thorough experiment of Edinger's proved that human nerve-fibers grow better when the tubes are united and are inserted in an artery. The tubes are made of agar jelly. The tubes grow by the action of the agar. A number of such tubes have been prepared and distributed for use to operating neurologists.

Edinger has seen the results obtained by Lindloff and Haselauer with 14 patients treated in this manner in which cases the distance between the divided nerve-ends varied from 5 to 5 cm. In every case there was clear evidence of good progress of regeneration in the nerve. Within a few weeks

the anæsthesia area became much reduced. He mentions particularly a case in which 6 cm. of the tibial and 8 cm. of the popliteal nerve had been resected. After inserting the agar jelly tube the return of the plantar reflexes was demonstrable after 16 days.

W. A. BROWN.

MISCELLANEOUS

CLINICAL ENTITIES — TUMORS, ULCERS, ABSCESSSES, ETC.

Byford, H. T. The Etiology and Prophylaxis of Cancer. *Illinois M. J.* 9 6 xxvix, 3.

The author presents a few fairly well established facts that have led him to draw certain conclusions with regard to the etiology and from these conclusions to formulate such recommendations of prophylactic nature as they may seem to justify.

We are justified in assuming for argument's sake, that carcinoma is an infection and that it will not be a waste of time to make a review of facts and probabilities on this basis.

Although carcinoma is sometimes inoculated into the skin or other external epithelial surface, it is in a great preponderance of cases introduced into the system with the food.

The human feces are carriers of germs of carcinoma, both in individuals affected with the disease and in many who are not. The same may be said as to the feces of the dog and the cat.

The occurrence of primary infection in the colon and upper rectum shows that the germs that get by the pancreatic secretions can survive to infect the rectum. If they reach the rectum alive they can, of course, be passed out and may find lodgment elsewhere.

Those who are most subject to carcinoma are those who work in dirt and eat the greatest variety of food. Thus chimney-sweepers, industrial laborers in large towns, city laborers, farmers, and carpenters, all of whom have a high rate of mortality, work in dirt and have not always the means nor incentive for frequent washing, while pressmen, compositors, and printers, whose working materials are protected from outside contamination and whose surroundings are such that they can and do wash and clean up when they go to lunch and go home from work, have a lower rate.

There are probably several factors that have some influence upon the increase of cancer in recent years. The increase of railroad traffic may be supposed to have some effect in spreading infection through travel of individuals and through the enormous amount of cold storage food that is carried every where. Some of the travelers and some of the food must be infected.

Since duodenal ulcer is a more common lesion than gastric ulcer and yet seldom becomes infected with carcinoma, and since trypsin, which is poured

into the duodenum also prevents continued superficial development of carcinoma on surfaces with which it is kept in contact, the question arises whether trypsin, possibly some vegetable ferment, or synthetic imitation, could not be used for the destruction of the disease or the production of immunity. Whether injections of trypsin or a similar substance into and around the carcinomatous mass, into the afferent blood vessels or into the col or the general circulation could be worked out so as to be curative, is perhaps worthy of serious thought if not experiment.

The following recommendations are suggested.

Carcinoma should be considered an infectious disease.

Precautions against the spread of the infection should be taken by the community as well as by the individuals affected.

3. Foods, particularly fruits and vegetables, should be protected from contamination at their source and in transit.

4. The disposal of human excrement in suburban and populous rural and manufacturing districts should be such as to avoid possible contamination of the surface soil. The feces of patients with carcinoma of the alimentary canal and pelvic organs should receive the same attention as those of patients from typhoid fever or cholera. Women should be taught the infectious nature of normal stools, with particular reference to keeping the perineum free from contamination.

5. The number of cats and dogs in populous districts should be restricted and they should not be allowed to roam about the streets by day or night. The excess should be killed. Means should be taken for the extermination of rats, mice, cock roaches, and other vermin.

6. Individuals whose occupations are known to expose them to great risk of infection from carcinoma should be taught that it may get into their systems either through the irritated skin or by way of the alimentary canal.

7. All epithelial areas affected with chronic irritation and erosion should be attended to. An attempt might also be made to prevent infection of ulcerated and eroded surfaces in the alimentary canal. Patients with such lesions should avoid all unsterilized food that might be contaminated.

8. Municipal authorities should put carcinoma upon the list of diseases to be reported in order that the patients may be traced and taught how to take

care of themselves and their infected discharges and that none of those living with them be allowed to handle foodstuff for the market.

9 The blood of patients with carcinoma should be exhaustively studied with reference to the discovery of something that will increase immunity.

10 The time would seem to be ripe for teaching the public something concerning the erroneous notions about diet that are prevalent among the idle rich and prosperous poor in order that they may stop manufacturing the serious forms of gastrointestinal disease that have of late years shown such an alarming increase in frequency the seeds of which are shown in adolescence and the fruits of which are harvested at maturity and in senescence.

11 Women who have not borne children for several years should be warned of the danger of developing carcinoma and should not only be on the lookout for symptoms, but should submit to a pelvic examination at least twice a year until it is evident that the mucous membranes are healthy and are remaining so. EDWARD L. CORNELL.

Moulton G. M.: The Classification of Tumors. In N. S. Phil. 9 6 13 5.

The great variety of tumors makes their classification difficult and according to the author no previous classification can be said to meet all the requirements. Instead of classifying tumors on the basis of malignancy, structure, or origin, the author submits what he believes to be a better classification.

Using the word in its ordinary nomenclature, tumors are divided into two classes. One is due to the reproductive power that all tissues naturally possess when suddenly aroused into action the other to changes that should take place in development but being either carried out. The power of reproducing their like directly without assistance from any other source is the common property of all living things and all parts. The extent to which they make use of this power furnishes the most satisfactory basis for the classification of tissues and of the tumors that grow from them. At a very early period of development one group of cells is marked off for reproduction the germ cells. The rest of the cells known as the somatic cells become specialized for other kinds of work and gradually lose their reproductive power. Each cell as it develops passes through all the stages through which its ancestors passed in the course of evolution. The structure of a tumor depends upon the parent stem and always resembles it though it is never so perfect. Malignancy of the tumor depends then upon the maturity of the parent cell at the moment the bud began to grow. If the parent cell has already reached the adult age the bud will increase proportionately slow, pushing the surrounding structures to one side instead of invading them. There is no separate class of malignant tumors, rapidly growing malignant forms occurring in all classes.

Under the head of tumors of the germ organ and

its derivatives the author has included fetus in tergo teratomata, ovarian dermoid, and ovarian adenomata. The classification of tumors that grow from the somatic cells depends upon that adopted for the tissues themselves. Every organ and every tissue has its own kind of tumor. Tumors of the thyroid may resemble those of the prostate but behave very differently.

Tumors due to errors in development differ from those caused by the sudden awakening of the reproductive power of the tissues in that they do not possess an independent existence and do not belong to the same generation as the structures from which they grow or to the next or mature arrest of development, one of the most important causes of tumor formation. This not only involves the progressive advance of tissues but the disappearance of those which have ceased to be of use. This group includes such tumors as the meningioma, the cerebellar tumor, the medullary groove tumor, the close to its proper time and also those tumors resembling the tumors of the hyaline duct or the thyroid duct or wherever tissues have failed to disappear in the evolution of the organism. GARDNER.

Allan A. P.: Phantom Tumors. (I. J.) (N. S.) 51.

The typical phantom tumor is resonant and is in motion conforming to that muscle or group of muscles with which it is associated it is always resonant but less so than the neighboring part. It is said to disappear during sleep but it does not invariably do so. Pain is absent though some cases run into a cramp in which case the pain is intense.

The author reports two cases both in women. In one the tumor was due to a contraction of the right rectus muscle. This patient recovered under suggestion. The second was due to a dilated cecum following mucous colitis. It disappeared.

The treatment is to move any focus of irritation that may be present or if due to occupation consider the condition for a remedy. Calisthenics and massage have proved useful and purely neurotic cases respond excellently to suggestion. It is well to bear in mind protective phantom tumors and to seek for the cause in deeper or other organs. EDWARD L. CORNELL.

Roberts J. B.: A Further Note on the Etiology of Surgical Scarlatina. T. M. S. 5 1 Wash. 1916 M. 3.

The author states his belief that true scarlatina sometimes occurs by the introduction of the infecting agent through a breach in the skin instead of by the usual faecal or nasal route and in his opinion there is reason to believe it at the difficulty in isolating the infecting organism is probably due to its ultramicroscopic size and its filarial nature. He also suggests that the anginose affection termed scarlatina may cover more than one specific infection.

tion. This last opinion is based upon the confusion which has long existed between similar infections such as typhus and typhoid fever, malarial and yellow fever and other well-known infections with similar symptoms. Reference is made to the papers of McCarty and Hamilton. He believes that many cases of so-called post-operative scarlet fever are probably of septic origin or are due to vasomotor influences. Instances doubtless occur where the true scarlatinal affection is simply coincidence in a patient already suffering from wound received about the time of exposure to the infection.

The cases are cited of Strickler who about 20 years ago inoculated children with saliva of scarlet fever patients in the hope of producing immunity. Strickler believed that he actually caused acute scarlet fever by introducing the infection through a wound in the skin. The latest investigation of the etiology of this disease known to the author is that of Mallory and Medlar of Boston who found a gram-positive bacillus which they thought to be the true causative agent.

SERA, VACCINES, AND FERMENTS

Gellhaus: Some Observations Regarding Collargol Injections in Small Doses (*Einige Beobachtungen bei Collargolinjektionen in kleinen Dosen*). *Menschen med. Wochenschr.* 9 6 hft., 9

The author draws attention to the efficacy of small intravenous injections of collargol in infective diseases. In his earlier cases he used a 2 and 3 per cent solution, but in his recent practice he has reduced the strength to 1 per cent and in the case of children to 0.5 per cent.

He has treated altogether 143 cases of different inflammatory types with collargol. These include appendicitis, peritonitis, gonorrhoea, pneumonia, etc. As a general rule good results are obtained when collargol is injected in the early stages of the inflammatory process. The action of collargol is found to be powerless only when the infection is of a high degree of virulence.

Of the cases treated 34 were cases of appendicitis. Of these operation was necessary in 6. Of the others, died and 27 recovered with 2 cases of relapse. The early use of collargol not only facilitates the results of operation when such is necessary for inflammatory conditions, but it may obviate operation altogether.

W. A. BRENNAN

BLOOD

Rous, P. and Turner J. R. The Preservation of Living Red Blood-Cells in Vitro; Methods of Preservation. *J. Exp. Med.* 9 6 XIII, 9.

The authors state that there is practically no mention in the literature of attempts to keep red blood-cells alive for a long time *in vitro* notwithstanding the great practical advantage that such a method would afford. They believe that red blood cells could be used for serum reactions, or for cul-

ture media, or even under certain circumstances for transfusion.

In their experiment they make use of the cells of the blood of sheep and man. They seem to have proven conclusively that washed red cells are to be properly preserved they must be protected during washing and that plasma cannot be used for this purpose. They found that gelatin in one eighth to one fourth per cent in Locke's solution protected cells absolutely against injury during washing and even during prolonged shaking. This injury may express itself in hemolysis only after the cells have been kept for some days. They found it most test in the use of dog, opossums, and a ill marked sheep and rabbit cell. The fragility of the red cells, as indicated by washing or shaking them in salt solution they are different, not only for different species but for different individuals. It varies independently of the resistance to hypotonic solutions. The important point that the protection of fragile erythrocytes during washing is essential if they are to be preserved for a very considerable time. The addition of little gelatin—one eighth per cent—to the wash fluid was found sufficient for this purpose. It is the period of survival in salt solution of washed rabbit, sheep, and dog cells was greatly prolonged.

Though gelatin itself is too toxic for red cells they did find it very useful to them in the real sense. Cells did not last longer when gelatin was added to the fluids which they were kept. Locke's solution though probably better than Ringer's solution in which words in blood solution medium in which to keep red cells is it may be harmful. The addition of innocuous blood did not improve it. But the sugars especially dextrose and saccharose had the authors at it remained power to prevent its injurious action and possessed, in addition preservative qualities. Cells washed in gelatin Locke's solution and placed in a mixture of Locke's solution with a isotonic watery solution of sugar remained intact for long time—nearly two months in the case of sheep cells. The kept cells went easily into suspension free of clumps, they passed readily through paper filters, took up and gave off oxygen, and when used for the Wassermann reaction behaved exactly as did fresh cells from the same individual. The best preservative solutions, the authors state are approximately isotonic with the blood serum. If the cells are to be much handled gelatin should be present for the sugars it was found did not protect against mechanical injury.

G. M. E. BEILY

Morris, W. H. Secondary Hemorrhage in Military Surgery. *Med. Surg. Rep.* 9 6 VII, 3.

The inefficiency of accepted methods of controlling wound infections has been one of the surgical surprises of the present war. Almost every case is infected many of them seriously. Serious complications frequently arise and one of the most serious is secondary hemorrhage.

Secondary hæmorrhage may originate from one of several causes. (1) A thrombus closing the end of a severed vessel may become infected, digested and hæmorrhage result. (2) A vessel wall may be contused and hæmorrhage occur only after sloughing has occurred. (3) An intact vessel wall may be eroded by direct extension of a sloughing infection from neighboring tissues. (4) A spurious aneurism may have its sac wall infected and rupture occur.

Other factors besides infection which may lead to secondary hæmorrhage are (1) a hæmorrhagic diathesis may exist (2) the jolting and jarring incident to transportation may excite hæmorrhage and (3) a foreign body in the wound may cause hæmorrhage by eroding the vessel wall.

The onset of secondary hæmorrhage is usually sudden and the patient may be found in collapse lying in a pool of blood.

The treatment should attempt the control of the hæmorrhage and the resuscitation of the patient. The control of the hæmorrhage may be secured by ligation of the bleeding vessel as far above the area of infection as possible. Frequently however recurrent hæmorrhages occur and usually amputation of the bleeding vessel be in a limb as high as necessary is undertaken. The resuscitation of the patient is effected chiefly by normal saline hypodermoclysis and blood transfusion.

The author reports five cases coming under his own observation and gives a complete history of each case.

J. H. SMILE

Hess A F: The Blood and the Blood Vessels in Hemophilia and Other Hemorrhagic Diseases. *Arch. Int. Med.* 9:6 1913

Hess believes that the group termed the hæmorrhagic diseases includes a large number of abnormal conditions and that at the present time it is a fruitless task to attempt to unravel the various entities embraced by the clinical conditions which are assembled under this general head. Thus he considers as due partly to the fact that the physiology of the coagulation of the blood is still incompletely understood partly because of the impossibility of analyzing the various factors concerned in coagulation and in part because these hæmorrhagic states have been incompletely observed from a clinical point of view.

In this investigation therefore the author considers the condition of purpura rather as an entity and compares it to hæmophilia. The main points in his study may be summarized as follows:

The coagulation time of the plasma in hæmophilia at times may become normal without the occurrence of hæmorrhage or other apparent change in the condition of the patient.

The estimation of the number of blood platelets is of great value as has been found by others, in differentiating between purpura and hæmophilia. In some cases of purpura the platelets are abnormal and may be differentiated like other macrocytes

and microcytes of the blood into macroplatelets and microplatelets.

The puncture test — the reaction following subcutaneous puncture of the skin — is an aid to diagnosis. In hæmophilia a hæmorrhagic area rarely results from this procedure in purpura it is the rule.

The capillary resistance test is also of value. By this is understood the reaction following the application for a definite period of a tourniquet to the upper arm. In purpura this results in petechial hæmorrhages on the forearm in hæmophilia the result is negative.

There is an hereditary purpura as well as an hereditary hæmophilia. The type of purpura should be more generally recognized so that these cases will not on account of their hereditary history continue to be regarded as hæmophilia.

The male member of a family may be a bleeder of the hæmophilic type and the female of the purpura type. Two families are described in which one member suffers from hæmophilia and another from purpura.

Hæmophilia may be atypical. A case is reported which showed a album deficiency as born out by various hepatic and biliary tests (hæmophilic calculus).

In some cases manifesting hæmorrhage the vessel seem to be involved. This weakness is encountered in children and may be congenital it may appear in the course of an infectious disease or of a nutritional disorder such as infantile scurvy.

In the classification case the differentiation between hæmophilia and purpura is simple. The history of a typical hæmophilic is a male with a hereditary history of bleeding whose blood manifests a definite delay in coagulation time whose platelets are normal in number bleeding time not increased who shows no hæmorrhagic reaction following subcutaneous puncture of the skin and a negative capillary resistance test. A typical case of purpura is found to be quite different the patient may be a male or a female the plasma coagulates in almost normal time and the number of blood platelets is decreased (frequently below 100,000 in number) there is definite subcutaneous hæmorrhage following puncture of the skin an increase of the bleeding time and the development of a large number of petechial hæmorrhages following the application of a tourniquet.

GEORGE I. BELL

Meyer W: The Conservative Treatment of Gangrene of the Extremities Due to Thromboangiitis Obliterans. *J. S. G. Phila.* 9:6 1913

After a discussion of a number of cases which the author has treated conservatively with most encouraging results and a review of the various methods of treatment of both acute and chronic gangrene of the extremities, the author discusses in detail that type due to thromboangiitis obliterans. He believes that conservative treatment should always be instituted before an amputation

is considered. If gangrene has begun, it is obviously impossible to replace what is dead. The progress may however be stayed old obstinate ulcers may heal, and otherwise uncontrollable pain can be relieved.

Conservative treatment consists in the use of superheated air or Bier hyperemia. This is best combined with systematic hypodermoclysis of Ringer's solution. If these simpler methods prove of no avail conservative operative measures are indicated viz. tying of the femoral vein or arterio-venous anastomosis. Both of the latter methods should be subjected to further careful clinical research as to their real value. Superheated air treatment may bring improvement of the symptoms, but a lasting beneficial effect is rarely seen. It seldom controls the pain. The systematic hypodermic injection of 400 to 500 ccm. of Ringer's solution (Mateodma Koga) daily or every second or third day deserves a definite place in the conservative treatment. Its effect may be lasting or temporary but if temporary repetition usually again brings improvement. Two such series of injections represent a sufficient test as to their usefulness. Internally a simultaneous administration of organotherapeutic preparations deserves a careful test. Since women seem to be immune to the disease it has been suggested that something in their system protects them and for this, if for no other reason, extracts of organs should be given a trial.

Inflammation of the wall of the blood vessels of the next higher group i.e. the capillaries, arterial as well as venous, seems to be responsible for the thrombosis (Rueger). Its cause may be microbic but the fact that women are immune again seems to argue against this. The increased viscosity of the blood viz. blood that is thicker than normal, seems to play an important rôle in the etiology of the disease. It is possible that an altered quality of the blood as such represents a cause for the occurrence of the thrombosis and the subsequent gangrene. On the basis of this reasoning procedures which tend to reduce the coagulability of the blood within the body deserve to be tried in an effort to find the underlying cause of the trouble. Intravenous injections of anticoagulating substances, such as a 1 per cent watery solution of sodium citrate may prove to be a useful adjuvant to the systemic hypodermic administration of Ringer's solution. GATZWOOD.

McLean, A. Venous Thrombosis and Embolism, Its Cause, Significance and Consequences. *Proc. M. J.* p. 6 xix, 3, 8.

The author describes some experiment on dogs undertaken to explain the cause of the thrombotic process which occurs, for instance as a femoral thrombosis following an apparently clean appendectomy where the common etiological factors, such as (1) trauma to the intima, (2) stagnation or

slowing of the blood stream, (3) chemical changes in the blood, and (4) infection are wanting.

It was impressed with the tremendous amount of injury a vein could withstand without the formation of a thrombus at the site of the injury.

The following phenomena were noticed in the course of the experiments.

1. When a vein is ligated in continuity the blood in the vein will clot only on one side of the point of ligation, that is, the side from which the blood is coming.

In ligating a vein between two ligatures (two inches apart) the blood between the ligatures clots very slowly and if left for a week or more the contents of the ligated vein will have completely disappeared, a fibrous cordlike structure alone remaining.

3. The same result is accomplished by ligating an artery between two ligatures.

4. Simple crushing of a vein will not cause a clot at the point of crushing. The crushing can be repeated to forty-eight hours and a clot will not form at the site. Examination of the repeatedly crushed vein two weeks after the last crushing, will show a thickening of all the coats of the vein the intima remaining smooth and glistening.

5. Crushing the vein with the subsequent introduction of a 24 hour bouillon culture of staphylococci, and again crushing the vein, grinding the staphylococci into the vein wall did not produce a clot or thrombus at the site of the crushing or the injection of the bacteria.

6. The introduction of a sterile thread into the lumen of a vein, allowing one-half to three-fourths of an inch to be suspended inside the vein, failed to produce a clot or thrombus.

7. The same experiment was negative in the artery allowing the thread to remain four, five and seven days.

8. Thread infected with staphylococcus albus or aureus will cause thrombus in three or four days.

9. Thread infected with colon bacillus or staphylococcus aureus introduced into an artery caused the formation of a firm clot.

10. Sterile thread one-half and one inch long let go of the circulation caused no symptoms.

11. Infected thread (colon bacillus) let go caused death in three and one-half days. Thread infected with blood-clot recovered in the right lung.

In reviewing his records of the past two years in 1,610 laparotomies, thrombosis and embolism followed in 33 cases 2 per cent. There were 9 fatal cases of embolism. There were 3 cases of pulmonary embolism followed by abscess and recovery; 2 of hepatic embolism followed by abscess with one recovery; 2 of cerebral embolism followed by death. There were fifteen cases of femoral thrombosis following pelvic operations.

It is worthy of note that in all the cases of embolism and thrombosis in the entire series, there was only one case of embolism with recovery and no cases at all of thrombosis that followed operations in the upper abdomen. LUCIUS H. LAMOREY.

Palmer, G. F. The Operative Treatment of Thrombo Angiitis Obliterans. *St. P. M. J.* 1916 2: 414.

The author cites a number of cases that have come under his observation which he puts in the classification so well described by Leo Burger.

All of his cases were in young Russian Jews. Occupation can not be traced as a causative factor as his cases are found in many different callings. However his observations coincide with Ehrlich so much as excessive cigarette smoking and inveterate tea drinking has been noticed in all his cases. The unstable nervous system of the Jewish race as a whole may play a part in this condition as almost all of his patients have been temperamentally neurotics.

The patients complain of disagreeable sensations in the feet and sometimes in the calves of the leg, this increases to pain and is associated with a congestion of the toes which extends to the dorsum of the foot possibly as high as the malleoli.

A dependent position of the foot aggravates this congestion and the pain is more severe and of a burning character the longer the foot is allowed to hang. Pain and congestion are appreciably lessened by elevation. Anterior and posterior tibial pulse is very feeble or absent. Gangrenous areas may be noted if the caliber of the vessel is sufficiently encroached upon.

Pseudo-arthritides are quite prevalent among the Jewish people as described by Solis-Cohen. A certain amount of apparently bona fide capsular thickening gradually develops even in these purely functional or neurotic joint disturbances. If such actual physical changes can take place in and about joints as the result of a non-inflammatory condition the author advances the hypothesis that given the activity of a similarly disturbed nervous mechanism in the peripheral vessels of the extremities one might expect to find these vessels occupied by a thrombus which would attach itself to the walls and organize into connective tissue thus narrowing or occluding the lumen of the vessels.

The author is in favor of conservative treatment rather than amputation especially in the early cases. This treatment consists in rest, elevation of the limb combined with keeping it well wrapped in cotton wool discontinuing the use of tobacco, alcohol, tea, etc.

This necessarily means a long tedious treatment but with sufficient means or hospital facilities the end results justify the sacrifice of time.

LUCAS H. LINDAY

Lindeman, E. Reactions Following Blood Transfusion by the Syringe Cannula System. *J. M. A.* 1916 1: 64.

Lindeman states that the syringe cannula system has greatly simplified the procedure of blood transfusion which now occupies a prominent and permanent place in therapeutics. In the first 150

transfusions by his method chill followed by fever occurred in approximately 33 per cent. He has found that hemolysis never occurred without chill and fever unless the patient lies lying or shortly after the transfusion. He therefore states that chill and fever in transfusion are due to hemoglobin set free in the circulating blood. If the hemoglobin set free is abundant it appears in the urine when the amount is moderate hematuria or hemoglobinuria in the urine when hemolysis is light. No blood pigment appears in the urine.

In this series of cases the preliminary blood tests for hemolysis and agglutination were conducted by different serologists. In very few cases when hemolysis occurred and in which preliminary test had been made, Lindeman had the test repeated later and in a high percentage of patients was detected in the second examination. He notes that there was error in the primary examination and has set himself the task of eliminating this error by personal supervision of the laboratory work and following refined method of detection so as to prevent even a slight degree of hemolysis of which the only manifestation is chills and fever.

His technique for testing for hemolysis and agglutination is as follows: The red blood cells of the patient and donor are washed three times with normal saline, variable quantities of patient's serum are placed in three separate small test tubes to each of these are added 0.5 ccm. of a 1 per cent suspension of washed blood-cells of the donor. The same is done with the donor's serum and the patient's cells. Controls are made of donor's serum and donor's cells—patient's serum and patient's cells. Controls are also made with donor's cells in normal salt solution and patient's cells in normal salt solution. The total volume in each tube is raised with normal saline to 0.5 ccm. of volume. The test tubes are incubated in a water bath for a period of two hours, and readings are made. They are then set in the ice box over night and readings are again made the following morning. When a case is urgent the ice box test is eliminated.

In the last 155 transfusions performed by the syringe cannula system with personally supervised preliminary tests no case of hemolysis and no death referable to transfusion occurred. Chills followed by a rise in temperature occurred in sixteen instances. Adults received from 1000 to 1800 ccm. in each transfusion and the quantity enumerated was always taken from one donor. No foreign substance or anticoagulant was employed in any case.

In the syringe cannula method of Lindeman the entire mass of blood is outside the body for a period of from six to ten seconds regardless of the amount transferred. It passes through a minimum amount of foreign material. Embolism or clotting never occurs in transit. Syringes are cleaned as fast as used. Clotting in the syringe can not occur and the blood is transferred uninjured exactly as it exists in nature. There are no stopcocks valves or

rubber tubing about which blood may clot and there is no blood system into which air may leak.

His conclusions are as follows:

1. The preliminary hemolytic and agglutination tests when properly performed are reliable.

Incidents of hemolysis in transfusion can be eliminated entirely.

3. The reactions which follow transfusion when curat test is made are eliminated in all except 9 per cent of the cases. In this 9 per cent chills and fever alone occur. When the quantity is 800 ccm. or less chills and fever do not occur.

4. By careful, curat and complete hemolysis and agglutination tests when work is done skillfully blood-transfusion is robbed of all danger attending its use.

ALAN ST. ENNA, MD.

Cherry, T. H. and Langrock, E. G. The Relation of Hemolysis in the Transfusion of Babies with the Mothers as Donors. *J. Am. Med. Ass.* 9, 6, 1914, 625.

Cherry and Langrock consider that hemorrhagic disease of the newborn is one of the most frequent and alarming of the diseases in combating which transfusion is required. The cutaneous injection of animal or human serum (Welch) or of whole blood (Schloss) has been used with a considerable degree of success, but there have also been great many failures. The transfusion of blood, however, has given highly gratifying results.

On account of the close relationship of the maternal and foetal bloods, therefore, it is a natural supposition that complete compatibility of infant and mother's blood should exist. In order to establish this fact, the authors have performed a series of hemolytic tests in 34 instances, 30 newborn babies and their own mothers. If it is known beforehand that the mother's blood is compatible it will save delay in finding a compatible donor. In making the necessary serological tests, and in the expense which these conditions entail.

In the 34 tests carried out no hemolysis or agglutination occurred. Accordingly the authors conclude that all mothers can be used as donors for their infants in the transfusion of blood, provided no contra-indications exist on the mother's part.

The authors report one transfusion performed since these experiments were concluded in which, without preliminary blood tests, 60 ccm. was successfully transfused from the mother through the external jugular vein, by the indirect syringe procedure of Unger. They estimate that 60 to 75 ccm. are sufficient to supply the infant with necessary elements to promote clotting and to replace those lost by hemorrhage. They recommend the indirect method for its simplicity.

ALBERT EISENBERGER.

Rous, P., and Turner, J. R. The Preservation of Living Red Blood-Cells in Vitro; Transfusion of Kept Cells. *J. Exp. Med.* 9, 6, 1913, 39.

Having described in a previous paper the methods whereby red blood-cells may be kept intact for

long periods *in vitro*, Rous and Turner have undertaken to determine whether cells kept according to these methods were alive in the sense that they were capable of functioning in the animal body. Thus they have attempted to determine by transfusion if the kept cell in bulk with appropriate control. They have performed many such experiments, using rabbits.

In order to determine the suitability for functional uses of red cells kept *in vitro* by their methods, transfusion experiments were carried out with rabbits by which large parts of their blood was replaced with kept rabbit cells suspended in Locke's solution. It was found that erythrocytes preserved

mixtures of blood sodium citrate saccharose, and water for 4 days and used to replace normal blood remained in circulation and functioned so well that the animal showed no disturbance and the blood count, hemoglobin and percentage of reticulated red cells remained normal. Cells kept for longer periods, though intact and apparently unchanged when transfused soon left the circulation. Animals in which this disappearance of cells took place on large scale remained healthy save for the progressing anemia. The experiments proved that in the exsanguinated rabbit at least transfusion of cells kept for a long time *in vitro* could be used to replace the blood lost and that when the cells had been kept too long but were still intact they were disposed of without harm. The indications are therefore that kept human cells could be profitably employed in the same way.

GEORGE E. B. HAN.

BLOOD AND LYMPH VESSELS

Leclerc, W. J. A Clinical Lecture on Aneurysms of War Wounds. *Am. J. Surg.* 9, 6, 1914, 33.

Leclerc classifies 50 cases of traumatic aneurysm and emphasizes some points in regard to their treatment. Of the 50 cases, 30 were arterial and 20 were arteriovenous, 7 were of the vessels of the head and neck, 4 of the vessels of the upper extremity and 39 of the vessels of the lower extremity. The popliteal suffered more frequently than any other vessel. There were 4 deaths in the series.

The signs of traumatic aneurysms vary somewhat from those of pathological aneurysms. The bruit is usually much more marked and the thrill is harsher. Where the clot is large the pulsation, bruit and thrill may entirely disappear.

With regard to the treatment of traumatic aneurysms in general the author makes the following suggestions: (1) Delay operation as long as possible in order to allow time for collateral circulation to be established. (2) Always be prepared for profuse hemorrhage. (3) Make long incision in order to secure an abundance of room.

The methods of dealing with traumatic aneurysms are three: ligation of vessels, operations on the sac and amputation.

The application of ligatures to the artery on the

proximal and distal sides of the aneurism is quite the best method of treatment. A ligature on the proximal side alone is uncertain in its results and may not control the bleeding. The ideal method of treatment is to apply a tourniquet, open the sac, pass a probe into each communicating vessel and ligate each one externally, but it is not altogether easy and causes a good deal of disturbance.

Amputation is required if gangrene has set in and may possibly be the safest as a primary treatment where there is a diffused traumatic arterial aneurism. Quadruple ligation with excision of the intervening portion is the best method of treatment in arteriovenous aneurisms. J. W. TURNER

Haberland, H. F. O. The Epitaphs in Wound Aneurisms (Zu Epitaphen der Schussaneurysmen). *Deut. klin. Wch. Nr. 1916* No. 100.

In the case of traumatic aneurisms of the extremities it is only permissible to speak of a cure when complete functional use of the organ has been restored and provided there is no serious secondary injury.

Great caution must be observed in making the prognosis, owing to the danger of late gangrene developing; observation after operation should be continued for at least six weeks.

Early vessel-suture is favorable to early recovery. Oval suturing is to be preferred. Arteriovenous aneurisms ought always be operated upon on account of the danger of embolism. Conservative treatment will not effect an anatomical cure.

W. A. BREYER

Judd E. S. Cerebral Aneurism. *St. P. M. J.* 96 VIII 48.

The author reports quite an extensive case involving the entire forehead in which there was a large mass over the bridge of the nose which extended into the right lids, entirely closing the eye. The dilated vessels passed back through the scalp to the occipital region. The right facial artery was considerably dilated as it crossed the border of the jaw at the anterior border of the masseter muscle.

Under ether and local anesthesia, the right external carotid was ligated as well as the facial just above the submaxillary gland. The pulsation was considerably diminished in the prominent part of the angioma, but in a few days the condition was the same as before operation.

Six days later the opposite external carotid was ligated which practically stilled the vessels. The patient was comfortable for a few days, when the skin of the scalp over the aneurism became tenser and extremely painful. The scalp and tissue about the face were very sensitive. The pain was so great that morphine had to be administered freely.

Five days later the scalp was incised from the glabella to theinion, down to the periosteum. The scalp was reflected on both sides and the dilated and thrombosed vessel were dissected out. There was

no tendency to hemorrhage or active bleeding. The scalp was sutured. One or two separate incisions about the face and temporal region were necessary and the vessels in these regions extirpated. Swelling occurred in the fifth scalp-flap. The aneurism was satisfactory and the patient has been doing well in the past six months.

The author discusses the various forms of treatment which have been advocated for these lesions, such as the ligation of the internal vessel, the coagulation of blood by means of an electrolytic galvanocautery, electric puncture, etc. When the condition appears in the arm, amputation may have to be resorted to. Some observers recommend letting these tumors alone unless the action or severity of the condition enlarges them. In the patient compressed in the tumor a simple but inefficient mode of treatment. Ligation of the temporal and occipital also the branch of the artery leading to the affected part has been tried with no success.

While ligation of an external carotid may result the supply to the scalp, the ligation of both external carotids is more efficacious. Ligation of the internal carotid is far more dangerous, especially in the neck, and is not as efficacious as the ligation of the external carotid, as the brain has involved pruning of the latter vessel.

Fifty-one single ligations and forty-eight double ligations of the external carotid have been performed in the Rochester clinic without a single death, while in eight cases in which one common carotid was ligated there were two deaths.

LUCIA H. LAURA

Kuettner H. Experience in Injuries of the Large Blood Vessels in War (Miel. Erfahrungen in der Kriegschirurgie der grossen Blutgefässverletzungen). *Beit. klin. Wch. Nr. 1916* No. 101.

Kuettner's experience with injuries of the larger vessels including aneurisms is based upon 40 cases in the Graeco-Turkish, South African and the present wars.

Next to nerve injuries aneurisms are the most interesting to the surgeon. These classes of injuries give the greatest contrasts in peace and war. In vascular surgery, however, unlike surgery of the nerves, the surgeon can see the success or failure of his intervention at once without having to wait an indefinite period.

Injuries to the large blood vessels are so serious and the operator's difficulties so great that their treatment should be left to the most experienced and skillful surgeons. Kuettner classifies blood vessel injuries in three groups: (1) injuries with external hemorrhage, (2) injuries with internal hemorrhage, and (3) complete aneurisms.

Regarding external hemorrhages Kuettner states that the percentage of soldiers who die from hemorrhage on the battlefield depends on the kind of battle and the class of weapon. In artillery wound fragment of shells and especially pieces of steel

grenades cut through the vessel like a knife and there is a large external hemorrhage. The crushing effect even of the large modern projectiles counts for much less than the effects of splinters.

Aneurisms are more frequent with the present day jacketed bullets than formerly. The small entrance and exit wounds make it more difficult for the blood to flow. Regarding treatment of hemorrhage in the field the author states. In venous hemorrhage pressure bandages are usually sufficient. Ligation is rarely necessary. In arterial hemorrhage in about half of the cases, ordinary means—elevation of parts pressure bandage—suffice. Of 4 arterial hemorrhages only 1 required ligation.

When the firing is at close range death from hemorrhage is more common. Regarding aneurisms, they rarely result from grenade splinter or shrapnel wounds which are likely to be fatal. They are rare in wounds from jacketed bullets with fracture of the large bones; they occur only occasionally when the entry and exit wounds are large.

Secondary hemorrhages are even more important than primary. These may be the result of infection (septic erosion) or a splinter of detached bone may injure the vessel or it may be due to pressure of a drain in the vicinity of a vessel. It is not always noticed until the patient's condition is serious. If these secondary hemorrhages are frequently repeated amputation may be called for. If the secondary hemorrhage is from a main arterial trunk which is badly infected, amputation is the best course as suturing and ligation is out of the question.

The author has found vast benefit in parenchymatous septic secondary hemorrhage from intravenous injections of coagulum.

With regard to internal hemorrhages, the author states that hematomata are usually present in all war injuries of the larger vessels. They show pulsation. Where a vein is injured arterial blood frequently finds its way directly into the vein causing an arteriovenous fistula and the formation of hematoma is small.

Diagnosis of hematoma is usually easy but it may be confounded with abscess. On account of the possibilities of perforation, infection or gangrene of hematoma, and the fact that spontaneous healing is infrequent, the author thinks active early surgical intervention is indicated.

Kuettner treated altogether 93 aneurisms, 56 of these were complete and 37 were in the hematoma stage. 45 per cent were arterial, 55 per cent were arteriovenous, 73.6 per cent were treated by ligation, 26.4 per cent by suture. W. A. BECKMAN

POISONS

Freeman L. Chronic General Infection with the Bacillus Pyocyaneus. *T. Am. Surg.* 4 Wash.ington, 9 6 May

The author gave a brief statement of the prominent symptoms of pyocyanic infection together with

the main fact in its pathology and a somewhat detailed report of an instance of the more unusual chronic form of the disease, of which only a few cases have been recorded.

The author's case was an adult who had been ill for nearly eleven months. He had a high fever of the septic type, eruptions upon the skin, severe neuralgia, serous effusions and muscular paralysis and trophic.

During an exploratory laparotomy a cholecystostomy was done and a pure culture of the bacillus pyocyaneus recovered from the bile and thickened bile. From this a vaccine was made and administered to the patient following which the patient gradually recovered.

The features of especial interest in the case are

1. Its extreme chronicity (nearly months)

2. The typical neuralgic pains, followed by paralysis and muscular atrophy

3. The absence of the bacillus pyocyaneus from the blood and its presence in the bile. (The germ does not grow in the blood but is merely conveyed by it, lodging and multiplying in the vessel walls. It is found mostly in the parenchymatous organs, such as the liver, spleen, and kidneys; hence particularly apt to infect the bile.)

4. The absence of any discoverable point of infection unless it might be the teeth.

5. Recovery following drainage of the gall-bladder and the use of an autogenous vaccine

6. The occurrence of carbuncles of the liver

7. The presence of ascites and pleural effusion.

8. The satisfactory recovery after so severe and protracted an illness, with the exception of moderate paralysis of the lower limbs, which seems to be improving.

Burling G. Remarks on Delayed Tetanus. *Brit. Med. J.* 9 6 4, 337

Three cases are reported in which the incubation period varied from 50 to 53 days. In most of the cases the original wound had apparently healed before the onset of tetanus. The cause of the prolonged incubation period is unknown although several theories are advanced. At least two of the patients reported had prophylactic doses of a tetanic serum, which may have inhibited the growth of the organisms or neutralized all of the toxin available during the first days after the receipt of the wound. In several of the cases a lowering of resistance seemed to precede the onset of the tetanus. J. H. SMITH.

Abercrombie R. G. The Treatment of Tetanus. *Brit. Med. J.* 9 6, 4, 339.

Four cases are reported in full. The effectual daily dose would appear to be 10,000 to 12,000 units. This may be given twice a day in critical cases. The major portion of this dose should be given intravenously, subcutaneous injections being also used to maintain the effect. Intrathecal injections should be given daily or at such intervals as

the symptoms demand. The dose must be reduced gradually in order to prevent relapse.

All will agree as to the desirability of the treatment of a child wound as a preventive of tetanus, but when once the disease has declared itself, peroperative surgical intervention with the surface of the wound although recommended several authorities is a great handicap by considerable danger. Practice in animals by barrier would thus be broken down exposing the tissue to the tetanist.

SURGICAL THERAPEUTICS

McGuire S. The Post Hospital Care of a Surgical Patient. *J. M. J.*

The author urges the formulation of a plan whereby surgical patients leaving hospital would have their post-operative treatment supervised by the surgeon in cooperation with the attending physician. Patients are not immediately up after operation and they need resting time to turn to normal after the procedure. He has returned from a surgical study that the patient cannot be trusted to safeguard his health during this time for the knowledge of the patient on medical subjects often seems to be in proportion to their intelligence and common sense in everyday matters. Correspondence between surgeons and patients is usually a privilege. Use the patient usually fails to give importance and often either overexaggerates or underrates his symptoms.

In the author's opinion the best result in long up post-operative cases will result from the co-operation of the surgeon, the attending physician and the patient. The plan he suggests is as follows:

The patient on leaving the hospital is given a form setting the general points that will be of interest to him in his post-operative life with relation to his definite operation. He is told to report to his family physician for tonics, hypnotics and cathartics. A description of the operation and operative findings is sent to the physician and full explanation of the case is made to him so that he will be able to intelligently direct the patient in his post-operative care.

The author finds that about 90 per cent of the ordinary hospital cases can be covered amply with regard to their post-operative care by instructions on about 12 different types of blanks depending on the character of the operation. In about 10 per cent of cases it is necessary to enlarge on these instructions personally.

SURGICAL ANATOMY

Wood F. C. and McLean E. H.: The Effect of Phloridzin on Tumors in Animals. *J. Cancer Res.* 4: 19, 6, 1, 49.

Following the report of Benedict and Lewis in 1914 of the cure of malignant tumors in rats by the

use of phloridzin, the authors have conducted a series of experiments on the effect of phloridzin on the growth of tumors in rats. The results show that phloridzin has a marked effect in reducing the growth of tumors in rats. The authors conclude that phloridzin is a valuable agent in the treatment of malignant tumors in animals.

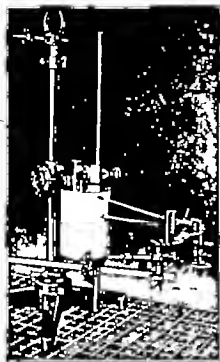
The authors also discuss the mechanism of action of phloridzin, suggesting that it may act by interfering with the metabolic processes of the tumor cells. They also mention the importance of the dosage and the duration of treatment in achieving the best results.

The authors conclude that phloridzin is a valuable agent in the treatment of malignant tumors in animals, and they recommend its use in conjunction with other therapeutic measures.

Concluding the review, the authors state that the results of their experiments are promising and that further studies are warranted to determine the exact mechanism of action of phloridzin and its potential for use in human patients.

Ulfredux O. Contributions to the Experimental Surgery of the Mediastinum, Excluding the Heart. *J. M. J.*

Ulfredux reviews the various methods of operating upon the mediastinum through the pleura and the various positive and negative procedures apparatus. He describes an apparatus which is a modification of the Meltzer-Yer apparatus which he believes has the advantage of preventing the reflex of ether in the respiratory tract and of permitting the use of oxygen instead of atmospheric air and of being applicable even to a positive pressure mask in case intubation should eventually fail or be contraindicated. With the aid of this device the author has been able to perform a large series of experiments upon dogs in which extensive operations were performed upon the esophagus, the thoracic aorta, the thoracic duct, the pulmonary



The elastometer (Schwartz)

artery superior and inferior vena cava and the vagi and the intercostal nerves.

With an experience of more than 300 narcooses in which the author has used this type of apparatus, he states that the method of narcoosis is not only excellent but is attended with the lowest mortality of any method that can be applied to animals. He states that he has never had a death during the narcoosis that could be ascribed to the method even when the anesthetic was prolonged for several hours, that the opening of both pleura is perfectly tolerated, that post-operative pneumonia is very rare, and that with this method one is able to work with almost no respiratory movement.

G ORGE E. BEZLEY

Schwartz, A. B. The Clinical Study of Edema by Means of the Elastometer. *Arch Int Med* 9 6 xvii, 396

The elastometer, an instrument devised by Schade to measure edema, the author believes promises to change the study of edema from a subjective one depending on the amount of pitting obtained on pressure to an objective one whereby the degree of edema may be expressed in exact terms. The instrument which Schade has devised consists of a disk mounted on a perpendicular vertical rod which is placed on the skin surface with the addition of a superimposed weight. The amount of depression caused by the sinking of the weighted disk into the

skin and subcutaneous tissue is graphically transferred by writing a vertical revolving drum making a horizontal curve. Surrounding this vertical disk is a measure of elasticity, a set of three similar vertical disks, which rest on the surrounding skin surface and divide it into separate lever on the revolving drum any movement of the central disk other than that solely the dilation or retraction of the weight. This line, known as the control line and must be straight in order to have the record of a value. Thus, if it is caused by disturbing factors, an abnormality is observed in the control line.

Schwartz believes that the use of this instrument with the elastometer, the elasticity of the skin will become more accurate. Although he thinks that with the present instrument the expression of edema in mathematical terms is not deemed desirable, but that the character of the curves, together with the deflection of the control line, would permit approximate estimation of the nature of an edema.

Furthermore, he states that the instrument makes possible the recognition of slight degrees of edema which heretofore could not be detected. Persistent evidence of elasticity loss despite the disappearance of other signs in patients with nephritis or endocarditis, Schwartz believes, indicates the advisability of more prolonged observation. Cases of this character.

G ORGE F. B. HALL

Ewing, J. Pathological Aspects of Some Problems of Experimental Cancer Research. *J Clin Research* 9 6 4, 7

The numerous experiments that have been conducted in this field seem to the author to point to the necessity of regarding all forms of neoplasms as specific diseases connected only by the fact that they are neoplastic in greater or less degree, but differing in their etiology, clinical course, and therapeutic possibilities. The habit of regarding cancer as a protean disease of uniform significance, the author believes may well be abandoned in the interests of progress, and when cancer research properly occupies itself in the study of the distinctive features of different cases of malignant disease, especially, he states, when it abandons the idea of a universal cure for cancer, it will be in accord with sound pathological sense. It will then not be necessary, he thinks, to talk wisely to the public about the obscurities of cancer etiology or to speculate about why cells grow lawlessly. Concerning the ultimate nature of neoplastic overgrowth, he says, we shall never have more than a descriptive knowledge.

G ORGE F. B. HALL

Haskins, H. D. The Uric Acid Solvent Power of Urin After Administration of Piperazine Lyssidin, Lithium Carbonate, and Other Alkali. *Arch Int Med* 9 6 xvii, 405

In a recent paper Haskins reported the results of an investigation of the uric acid dissolving power of

examethylenamine. He showed that the mode of action of that drug was quite different from that of the rest of those substances which have been used as uric acid solvents. He states that these latter if they act at all as solvents do so by virtue of being basic substances. His purpose in this paper is to report on investigation of the solvent power of the most important members of this class.

The organic compounds which he studied were uricazone and lysidin which are amine derivatives and the nitrogen of their molecules imparts to these substances a basic character so that they combine with acid. These substances are supposed to form salt with uric acid which are very soluble. The other compound which he studied were thium carbonate, sodium citrate and sodium carbonate which are supposed to act as alkalies, of uric acid forming lithium and sodium urates which are quite soluble. The conclusions which he author forms from his study are as follow:

1. Uricazone can raise the urine to dissolve an increased amount of uric acid and this effect is most marked if sodium citrate or bicarbonate be also given and if diuresis be avoided.

2. Lysidin can act as a uric acid solvent but is not a practical therapeutic agent because of the large doses required.

3. Lithium carbonate is a uric acid solvent if large enough doses are used, but is unsafe and possesses no advantage over sodium citrate or bicarbonate.

4. Sodium citrate and bicarbonate are reliable and satisfactory uric acid dissolving agents when given in such dosage as to keep the urine alkaline.

(ROGER E. BEALBY)

RADIOLOGY

Baumelster, A.: The Results of Combined Mercury Lamp and Deep X-Ray Treatment of Human Lung Tuberculosis. (Die Erfolge der Kombierten Quarzlicht Röntgen Therapie bei der menschlichen Lungentuberkulose.) *Deutsche med. Wochenschr.* 916 xiii 99.

The favorable results obtained in deep X-ray treatment of experimentally produced tuberculosis of the lung in animals have justified the extension of this method to the human subject. Kuepferle has recently reported on 44 cases in different stages treated by deep X-ray. In 19 cases in the first stages he got good results. He also got good results in 14 partly disseminated partly confluent cases, no permanent improvement was observed in 11 cases in the third stage.

Baumelster's experience is confined to 20 cases of stationary to latent phthisis subjected to one month's treatment. In 9 of these all symptoms have disappeared and in the others there were good results.

In a second group with fever and with chronic progressive symptom but without caseous sputum he counts 10 clinically cured patients. Of 23 patients

of this group in which there was no complete cure 19 have been much improved.

Baumelster abstains from the treatment of patients with high fever and rapidly progressing symptoms. As in the case of animal Baumelster thinks that the good effect of the X-ray treatment is not due to any effect on the bacillus but to the effect on the granulation tissue which is destroyed and replaced by cicatricial tissue. He thinks that combined with hygienic measures, roentgen therapy combined with mercury lamp treatment of lung tuberculosis has proved itself a valuable method in the limited number of cases in which it has been applied. W. A. BRAY.

Kuepferle and Baumelster: Experimental Grounds for Treatment of Lung Tuberculosis by X-Rays

Experimentell Grunderlagen für die Behandlung der Lunge (Tuberkulose) mit Röntgenstrahlen. *Deutsche med. Wochenschr.* 916 xiii 96.

The authors instituted a series of experiments to determine the effect of hard filtered X-rays on experimentally produced lung tuberculosis in rabbits. The conclusions which they draw from these experiments are that a beginning experimental tuberculosis of the lungs may be suppressed and an established tuberculosis may be healed.

The effect of the roaying is to transform rapidly growing tuberculous granulation tissue into cicatricial tissue. It has no effect on the tubercle bacillus.

Small doses of rays at long intervals have little effect, very large dosage without sufficiently long reaction intervals, may give rise to bronchitis and bronchopneumonia.

In animals a dosage of 20 to 23 at 3 to 5-day intervals effected healing. The mercury lamp had no direct influence on lung tuberculosis.

On the basis of their experimental findings the authors have introduced X-ray therapy for lung tuberculosis in the Freiburg Medical Clinic.

W. A. BRAY.

Hammes and Schoepf: Exact Localization of Foreign Bodies by Means of Roentgen Rays. (Zur genauen Lokalisation von Fremdkörpern mittels Röntgenstrahlen.) *Deutsche med. Wochenschr.* 916 xiii 25.

The authors describe the technical details of an apparatus to put into practice results obtained from certain mathematical equations which give the position of a foreign body located in the body. They claim that location can be obtained in a few minutes and that probably their method is superior to the many procedures described by others.

W. A. BRAY.

Wintz, H. and Baumelster, L.: The Proper Filter for Deep Roentgen Therapy. (Die geeignete Filter für Röntgentherapie tiefer.) *Deutsche med. Wochenschr.* 916 xiii 59.

The authors made a series of experiments to determine what was the best material and most

suitable thickness of a filter for deep roentgen treatments. Experimentation with various metals showed that the most favorable results were obtained with an aluminum filter 3 mm. thick and with a zinc filter 0.5 mm. thick.

To obtain an equal dosage on the skin with aluminum and zinc filters the exposure in the case of zinc must be three to three and one half times as long as with aluminum but at depth of 8 to 10 cm. the ratio is reduced to . . . At this depth when using the thicker zinc filter by doubling the strength of the rays, the same dose can be received on the skin as with the thinner aluminum filter. The advantage is that a dosage which with an aluminum filter would reach the erythema limit may be doubled by using a zinc filter. The authors prefer the zinc filter to any other. W. A. B. LOCKMAN

Case, J. T. Roentgen Treatment of Deep-seated Cancer. *Physica & Surg.* 9:5 XXVII, 44

Case states that in general it must be admitted that the X-ray treatment of deep-seated carcinoma has not up to the present time gratified the fond hope with which the discovery of this method was so fervently greeted.

In superficial carcinoma where there is deep ulceration with involvement of the neighboring glands, etc., a very thorough-going preliminary pre-operative roentgenization should be administered. On the ninth or tenth day a radical operation should be performed followed later by another X-ray treatment. By combining roentgenization with surgical intervention one is most likely to insure good results.

Discussing the question as to whether operable carcinoma shall be treated by irradiation or operation, Case states that the result which have thus far followed roentgentherapy of deep-seated malignant neoplasms do not warrant the belief that roentgentherapy affords a means of cure of these deep-seated lesions. In the light of our present knowledge it may be stated as an axiom that the X-ray method should never replace or in any way interfere with the surgical treatment of cancer.

In looking over the literature of competent authors it is seen that in about 25 to 30 per cent of the cases of uterine carcinoma, the results of roentgentherapy are very satisfactory from a palliative standpoint but as yet Case has not seen an instance of definitely proven cure of pelvic cancer following the application of roentgentherapy.

In mammary carcinoma good palliative results are nearly always the rule.

The good palliative results which have followed the X-ray treatment of recurrences and inoperable cases warrant the adoption of post-operative X-ray treatment as a routine in malignant cases.

The treatment should be applied as soon as possible after operation and as thoroughly as though the disease was still present in its entirety.

Case a technique in operable cases is to submit the patient eight or ten days before operation to cross-fire filtered rays in full dose in as many areas

as possible. Ten days after operation the patient is again submitted to a further series of treatments administered as though the tumor were still present. HOLLIS L. POTTER.

Hanford, C. W. Some Radium Physics. *Chicago U. R. and* 9:6 XXVIII, 43

Therapeutic tests that the high aim of the radio-therapist should be to direct the radium rays to the deep tissues where the disease is located with the least injury to the healthy structures and that in many instances where results have not been obtained from the application, failure may be traced to lack of knowledge of certain physical facts that had not been observed by the operator. A number of examples are given, such as where the use of radium has been supposed to constitute a given amount of radium element is tested after repeated failure and found to contain only a very small amount, thereby inadequate for the purpose. Methods are reviewed which if carefully observed will save the operator from such errors. W. S. NEWCOMB

Wood, F. C. and Prime, F. J. The Action of Radium on Transplanted Tumors of Animals. *J. Surg. Path.* 9:5 LXV, 75

The operations, based chiefly on clinical reports, of the therapeutic value of radium in the treatment of malignant growths have differed greatly. Whether the β - or the γ rays are the most efficient in treating tumors, or whether both should be employed, remains still undecided. For these reasons the authors carried out a number of experiments in the Columbia University to determine the biologic action of radium, using animal tumors as an index of the lethal effect. Rat and mouse tumors of various types were used among them the Ehrlich fibroblast mouse sarcoma and the Flucker-Jobling rat carcinoma. They were treated either after removal from the host or in situ, strict asepsis being observed. After exposure to the β - and γ rays, portions of the treated tumor as well as untreated fragments were inoculated with animals of the same strain. X-rays were not used.

These results are claimed by the authors from their experiments.

Three factors only are important in the action of radium on tumors: time of exposure, amount of the radium element, and distance between the radium and the tumor tissue.

1. The removal of the β -rays diminishes the effect of the radium but the effect of the γ rays is in accordance with the same general law which governs the β -rays.

2. Sublethal exposures hinder the growth of tumor cells for some time, while still shorter treatments seem to stimulate the cellular activities.

3. The facts derived from the experiments regarding the quantity of radium element and the time of exposure necessary for a given distance may be applied, with reasonable accuracy to human malignancies.

nant tumors. These experiments show that when only pure γ rays are used the necessary exposure is eight times as long as that required when the γ and hard β -rays combined are employed but as the latter are largely absorbed by the soft tissue the γ rays alone must be used for all deep work.

5 The effect of radium radiations on tumor-cells *in vitro* is less marked than on isolated cellular elements. This explains the fact that an exposure which will destroy a small metastatic nodule in man is quite ineffective in the case of a well circumscribed primary carcinoma.

H. L. E. I. TSLER

Quigley D. T. Therapeutic Effects of Radium.
J. L. M. 1915 95 (53)

Quigley thinks that in ordinary cases of cancer such as cancer of the breast etc. the best plan is to operate when operation is possible and use radium as an after-treatment to kill out such cells as may be missed by the knife and thereby lessen the chances for recurrence. He believes the great future for radium is as a post-operative treatment. The question with relation to radium in cancer is not Will radium supplant surgery in these cases? but Will our surgical results be bettered by using radium in conjunction with surgery?

H. L. E. I. TSLER

McConnell A. A. A New Medium for Pyelography
M. d. Press & Cure 96 of 136

For some years collargol, a colloidal silver preparation has been the medium most used for pyelography and although other substances have been tried as iodid of silver none have proved so generally satisfactory.

Since the war however collargol has become most unprocureable and McConnell in seeking a substitute in the English and American markets, failed to find anything but silver iodide which in his hands did not give as satisfactory results. He therefore consulted Professor Caldwell of the Royal College of Surgeons Ireland asking him for a salt opaque to X rays, harmless to the kidney, and capable of being injected through a ureteral catheter. Professor Caldwell was able to meet this request and supplied him with an entirely new bismuth compound to which the provisional name skiol is given. This is a non irritating substance, has the consistency of milk and is washed out of the renal pelvis by the urine before precipitation takes place. McConnell uses a 10 per cent solution and has obtained better pictures than any he has obtained with collargol. It has not caused irritation in any of his patients. Moreover he found that it disappeared from the pelvis more rapidly than collargol. Collargol has been found to remain in the renal pelvis from one to several weeks while in some cases in which skiol was used radiographs taken one or two days after the injection showed no shadow.

The technique is as follows. The patient is placed on the roentgen table the ureteral catheter is

introduced up to the renal pelvis, the X ray plate is fixed and preparations made to take a picture. The skiol solution is then allowed to flow into the ureteral catheter by gravity from a container which is held not more than 12 inches above the table. The kidney until the patient announces that some pain is felt in the kidney. At that instant the injection is stopped and the roentgenogram is taken. Then the fluid is allowed to run out and the catheter is removed.

D. VID. C. STR.

MILITARY SURGERY

Mott F. W. The Effects of High Explosives upon the Central Nervous System. *Lancet Lond* 1915 33

The author describes three groups of cases in which the nervous system was injured by explosives: (1) immediate death from a missile (2) injuries from high explosives which cause wounds but are not fatal (3) injuries of the central nervous system without visible injury. To the latter group must be added those cases which develop functional neuroses and psychoses.

The third group of cases is the one specially dealt with in this paper. Several theories are elaborated as to the possible causation of these intangible injuries to the nervous system: (1) Increased pressure in the cerebrospinal fluid may be the causative factor in these injuries. (2) Nerve-cells in a state of exhaustion are much more susceptible to shock than nerve-cells in the normal state. This fact may account for sudden death from the explosion of a shell without physical injury. (3) The sudden change in atmospheric pressure brought about by the explosion of a shell may result in the freeing of gas bubbles in the nervous tissues causing a similar condition to that found in caisson disease.

These theories are merely advanced by the author in a preliminary way and the discussion is to be continued.

J. H. SKILES

Vincent B. and Greenough R. B. Gunshot Wounds of the Soft Parts. *Boston M. C. S. J.* 1916 clxix 135

Vincent and Greenough at the American Ambulance, at Neuilly sur Seine report 318 cases of injuries of soft parts by missiles such as shrapnel balls, rifle bullets or shell fragments. The wounds were of every kind. In crated penetrating perforating or wide surface abrasions. When received at the American Ambulance a majority of the cases were from twenty four to seventy two hours old and were with few exceptions septic. On entering the hospital the patient was given a general anesthetic. The operation was devoted primarily to cleaning the wound and making free drainage. The wounds were enlarged as much as the extent of the infection required. The crushed edges of the wound and all the necrotic tissue were excised. All foreign material was removed. While in par-

ticular search was made at this time for missiles, for fear of spreading the infection to uncontaminated tissues, they were often discovered and removed. Pieces of clothing were often found just beyond or wrapped around the missile. When pieces remained in the tissues the course of sepsis was always prolonged. The use of rubber tissue for wicks and as a protective covering of raw surfaces prevented the gauze dressings from adhering to the wounds and saved the patients much suffering. Some of the most septic wounds were given continuous irrigations of sodium-hypochlorite solution, others had wet dressings that were frequently changed. Secondary sutures were done with good result in cases with extensive granulating surfaces.

The means of localization most frequently employed were the fluoroscope, X-ray plates and the Bergonier electromagnet. The magnet was operated with an alternating current in such a way that the shell fragment was put into rapid vibration. By placing a hand on the skin between the magnet and the foreign body the place of maximum vibration was noted and an incision made at that point. The method could be applied to missiles in the soft parts only and not too distant from the skin. The extraction of a missile was often facilitated by the use of an ordinary electromagnet. A metal probe with its outer end resting against the magnet was inserted into the wound till it touched the piece of metal. The magnetized probe would in turn attract the missile which was withdrawn with the probe from the wound. This method was employed successfully by Cushing in removing fragments of shell from the brain and by Blake on a piece of shell buried deep in the pleural cavity.

For routine work the fluoroscope proved the most rapid, accurate and economical means of localizing lodged missiles.

In certain cases where the fragments were small and numerous or because of an absence of symptoms, the missiles were left *situ*. A. H. Hixson

Weinberg, M. Bacteriological and Experimental Research on Gas Gangrene. *Lancet* Lond., p. 6, col. 6.

The work reported was first undertaken in the British Hospital at Versailles, September 1914, during the battle of the Marne, and was conducted later in a number of hospitals, both French and British. The majority of surgeons seemed to have a confused idea of the nature of gas gangrene at the beginning of the war and the tendency seemed to be to diagnose the condition every time a bad wound became infiltrated rapidly with gas. Two forms of gas gangrene are described (1) the classic and (2) the toxic form.

In describing the classic form the author gives the details of a case as follows: A soldier was admitted to the hospital twenty-four hours after being wounded. The foot and two-thirds of the leg were very much discolored, the discharge emitted a putrid odor. The leg and thigh were swollen as

far as the junction of the middle and upper third, the veins were distended, the skin browned, and there was crepitation on palpation around the wound. The temperature was 105°F. A few hours later crepitation extended over the entire leg and thigh and large blebs containing dark fluid were scattered here and there on the surface. The temperature rose to 104°F. Amputation was done in the middle of the thigh, the gangrene spread to the body and neck and death occurred at the end of the second day. Dyspnea was marked two hours before the end.

The development of some cases of this classical form was not always as rapid as in the foregoing case because the microbe chiefly responsible was of low degree of pathogenicity and in such mild cases radical surgery often saved the patient.

The toxic form is characterized by extensive edema sufficient in some cases to mask the gas infiltration. This form is illustrated by the following case: A patient admitted to a French hospital forty hours after he was wounded, having been exposed twenty-four hours between the French and German lines, after the receipt of the injury. There was a wound in the middle third of the forearm, crepitation around the wound was slight but extensive edema was present up to the middle of the arm and the veins were prominent. In spite of free incisions and irrigation with oxygen peroxide the edema extended to the shoulder and chest and death occurred twenty-four hours later without the appearance of much crepitation. There was a putrid odor which was not necessarily a symptom of the case and it bore no relation to its gravity since it might have been due to organisms of a few pathogenesis which were present.

The author exhibited some microphotographs of culture fields from cases which showed a variety of organisms, including bacilli perfringens, staphylococci streptococci and diplococci also bacillus sporogenes.

It seemed that gas gangrene was not due to any specific micro-organism. There is great difficulty in distinguishing bacillus perfringens from vibrio septique (malignant edema) and the toxins must be tested with antitoxic serum. Bacillus perfringens produces a large quantity of gas while vibrio septique produces less. A bacillus oedematis had also been found in some cases, the toxins from which when injected subcutaneously in guinea pigs produced a rapidly extending edema. This microbe was frequently associated with bacilli sporogenes. Weinberg emphasizes his belief that there is no flora peculiar to gas gangrene. A new microbe bacillus fallax, causing gas gangrene has lately been discovered, when and by whom is not stated. Some of the organisms found in the flora of gas gangrene emanate from the air others are of intestinal origin. Attempts to make bacterocultures have not been successful and they were rarely positive in the septic form of the disease. The very rapid course of gas gangrene in men and animals is thought to be

due to individual susceptibility. Careful observation and experiment have shown that gangrene of a limb is not always the result of gas-producing organisms but complete obliteration of the vessel may arise from non gas-producing organisms. It is interesting to note that gangrene of a limb following stoppage of the blood supply affords favorable conditions for the growth of gas-producing microbes.

To prevent gas gangrene wounds should be treated early and radically. The diminution in the number of cases occurring now as compared to the earlier period of the war is due to the well developed transport facilities which enable the relief corps to remove the wounded from the fighting front to a casualty hospital in a few hours. The wounds should be opened as widely as possible at once. Large projectiles and particles of clothing having been removed the wound should be irrigated with weak antiseptics and the irrigation should be often repeated. Good results are also obtained by the use of superheated air and intravenous injections of sal arsan. Injection of polyvalent serum drawn from all the organisms concerned was also considered helpful.

Moylman B. The Treatment of Gunshot Wounds. *B. M. J.* 9: 333

The treatment of gunshot wounds in the present war has become greatly complicated by several factors: (1) The wounded soldier usually lies for many hours or even days before he can be removed to the field hospital. (2) The modern high velocity projectile causes explosive destruction of tissue resulting in a large deep ragged wound which is always infected. (3) The battlefields have been so intensely cultivated that the ground contains many virulent organisms with which the bodies and clothing of the men are sure to become contaminated. (4) The hygiene of the soldier is necessarily very poor. In some instances clothing has been worn continuously for several months. This results in a filthy condition of the person which together with his general run down condition naturally leads to contamination of the wound.

The treatment of a wound therefore usually has to do with the combating of infection. A wound which is treated early may be excised or treated with some strong antiseptic but these early wounds are in the minority.

The treatment of an infected wound should be very thorough, the entire field being thoroughly cleansed and adequate drainage secured. Many antiseptic solutions have been tried the one which has given the most satisfactory results being Dakin's solution. Dakin's solution is made from bleaching powder forming calcium hypochlorite. It is a very effective antiseptic and does not apparently injure the tissues. Continuous application of the fluid to the wound is secured by continuous irrigation or by keeping gauze wicks soaked by immersing the ends in a dish of the solution. Sufficient drainage should be insured.

No gauze dressings or impermeable material should be placed over the wound as a close covering tends to dam up the secretion.

The hypotonic salt solution of Wright is highly recommended to induce lymphatic drainage. Morrison and Hullock have advised the use of a solution of magnesium sulphate in place of sodium chloride. Out-door treatment and plenty of fresh air in work wonders in hastening the recovery.

The use of a cines is still a matter of controversy but there are undoubtedly selected cases in which they do much good. J. H. SALT

Carrel Dehelly and Dumas. Secondary Closing of Wounds. *B. M. J.* 9: 336

The authors presented a paper at the Paris Academy of Medicine in January on the results of the early closing of war wounds that have been treated with the sodium hypochlorite solution prepared after the Dakin formula. They concluded that the secondary closure of wounds in from four to ten days is a general method of great utility.

Free incision of wounds alone formerly for exploration the removal of foreign matter and the use of drainage act as a drawback since they prolong the treatment and cause an undue amount of irritation. The latter kills the parts between the muscles, aponeurosis and skin which ends in adhesions and contractions thereby hindering function. To avoid this treatment by the Dakin solution permits the surgeon to bring the anatomical surfaces of a wound together by layers in the secondary closing of the wound just as he does in a primary operation. When brought together early connective tissue has not had time to form unduly it is reduced to a thin sheet which does not seriously interfere with muscular movements.

The authors open up all wounds primarily enough to admit of careful exploration cleansing and hemostasis. The hypochlorite solution is instilled constantly for several days by the technique already recommended by them in previous reports. As soon as the daily bacteriological examinations indicate the disappearance of bacteria the wound is closed usually in four to ten days. In those wounds that remain uninfected the tissues are unaltered in the course of the antiseptic treatment and the authors find that the wounds thus treated unite by first intention as is observed in operative wounds. The tissues should always be brought into exact apposition with adhesive strips 2.5 to 5 cm broad. If the skin becomes adherent to the subjacent structures and granulation tissue has filled the intervening space the skin is loosened from the edges of the wound the granulations curetted and the parts including the skin are then brought into apposition with sutures. This procedure hastens the rate of recovery avoids stiffness and atrophic changes.

McQuinn and M. Bazy believe that good surgical technique and irrigation are of more importance than the employment of sodium hypochlorite as an antiseptic. L. A. L. CARD

Bérard, L., and Lumière, A. Some Elementary Rules Relative to the Treatment of Suppurating Wounds in War (Quelques préceptes élémentaires relatifs au traitement des plaies de guerre suppurées) *Rev de chir* 19 6, xxiv 445

The authors call attention to the difference in the condition of projectile wounds in the recent period of the European campaign, where the fighting was in the trenches and that of the early period when the war was one of movement and projectile wounds were mostly uninfected.

The suggestions which the authors formulate in the care and treatment of suppurating wounds are (1) the removal as quickly as possible of all foreign bodies (2) the draining as early as possible of infected tracts, and the discharging of purulent collections by large incisions and very large drains (3) the treating of all wounds antiseptically using hypochlorites preferably especially the mixture of chloride of lime and boric acid (4) the frequent changing of dressings and preventing the adhesion of pieces of the dressings to the wounds (5) never to uselessly injure wounds (6) to use humid dressings only occasionally in particular cases renewing them quite frequently A. Goss.

Dalton, F. J. A. Sodium Hypochlorite in the Treatment of Septic Wounds. *B. u. M. J.* 9 6 1, 26.

Dalton on the British hospital ship *Rew* investigating the value of sodium hypochlorite in the treatment of septic wounds, reports a series of 57 cases. The results obtained were uniformly excellent and there was an absolute unanimity among the members of the medical staff in the hospital ship in the preference for hypochlorite solution in the irrigation of infected wounds. Wounds were enlarged, counteropenings made, bone fragments and foreign bodies removed etc. and thorough irrigation instituted with large quantities of hypochlorite solution. Rubber tubes were then inserted and gauze strips packed into all parts of the wound. The ends of the rubber tubes were brought out through the dressings that the hypochlorite solution might subsequently be renewed by means of a syringe. Fresh hypochlorite solution was applied in this way every two hours in the severe cases. In the worst cases the gauze strips were removed after twenty-four hours, in slight wounds they were left in three or four days, the wounds cleaning up with simply spraying fresh solution into the tubes.

Dalton points out the following advantages observed in the employment of the sodium hypochlorite solution when properly prepared according to the Dakin formula (1) The simplicity and cheapness of preparation of the antiseptic. (2) Being non-toxic and non-irritating to the tissues it may be used without ill effects in large quantities over long periods of time. (3) The deodorant action of the solution is remarkable. (4) The rapidity with which sloughs separate and clean granulation tissue is formed. (5) The infrequency of dressing required. (6) The

fact that injections of the hypochlorite solution into the rubber tubes used in the dressings may with safety be entrusted to very imperfectly trained or derbies without fear of ill results, once the case has been adequately dealt with by the surgeon.

A. H. HIXSON

Health of Armies in Peace and War. *Lancet* Lond., 9 6 ix 57

The annual report of the Surgeon General U. S. A. for 1904 gives us a valuable means of comparing the health of an army during peace with that of the armies in Europe. Although the army is small in comparison with the armies engaged in the gigantic struggle abroad it is sufficiently large to give valuable data.

Of the 88,000 men died of tuberculosis 15 each from pneumonia and chronic heart disease, 10 from cancer—ratios which correspond with those of other armies during years of peace. The influence of vaccination against smallpox and typhoid fever is still shown. Among the 88,000 men there were 7 cases of smallpox with 1 death and 3 cases of typhoid fever with no death.

The principal causes of admission to sick report were alcoholism and venereal disease although these were showing marked diminution in the last decade.

The Paris correspondent of the *Law* in a recent letter writes on the sick rate of the French army at the front and shows that the most serious infectious diseases of civil life such as scarlet fever and diphtheria, as well as mumps and less important ailments, are not so prevalent in the French army during peace. Typhoid has been more frequent but less fatal. No reference is made to the various pedal ailments of the present war—shell shock, soldier's heart, trench foot—and they may be intentionally omitted. The inference seems to be justified that the health of the French army has not been adversely influenced by the act of campaigning. Doctor Moisse of Berlin, a thorax of a well-known work on disease and social position has recently pointed out that diabetes mellitus and acute nephritis, often of the hemorrhagic form, are more frequent in the youthful combatants. The health of armies in peace and war has been conserved by the rules of sanitary science in all civilized countries. The devastations incident to cholera, cerebrospinal meningitis, typhus, typhoid, yellow fever and malaria are now practically unknown. The sanitary service of the military establishments today is rendered efficient by drilling the medical personnel in the duties of health officers. It is easier and less expensive to prevent disease than to treat it or to arrest its spread. In this regard the Sanitary Service of the British Army has accomplished a great deal in the present war. Every division of the army has a sanitary section consisting of 26 men (not including army service corps men) viz. one officer and 5 non-commissioned officers and men. The officer is generally a medical officer of health

or one who holds a diploma in public health service or as a bacteriologist some are sanitary engineers and even architects.

A large number of the non-commissioned officers are sanitary inspectors some hold sanitary diplomas others are plumbers carpenters schoolmasters graduates in honors from Oxford Cambridge and other universities solicitors chemists, and representatives of all professions and trades. In this varied personnel it is not difficult to provide each section with a sufficient number of disinfectors interpreters carpenters cooks builders for the special and varied services in the field. The work performed by these sections includes the bathing of troops by thousands disinfection of the men for vermin after enteric cerebrospinal fever and other infectious diseases. Their further duties embrace disinfection of all clothing and blankets purification of water the drainage of farms and billets giving instruction for the erection of destructors or incinerators ablution tanks grease traps urine pits filters fly traps and the installation of every kind of structure or appliance that appertains to sanitation in the field.

After great battles, when the casualties are so great in numbers that the ambulances cannot deal with them the personnel of the sanitary companies is called upon to assist in the care of the injured. This body of expert workers has rendered the Royal Army Medical Corps officers valuable assistance in many ways especially in watching over the health and sanitation of the soldiers.

Aside from the work of the medical corps and sanitary sections in warding off disease great assistance has been derived from auxiliary bodies like the Red Cross. Through its assistance the mortality among the wounded has been very much reduced since its organization by Henri Dunant a half century ago. L. A. LAURE.

SURGICAL PATHOLOGY

Razetti L.: Operative Mortality (La mortalidad operatoria). *Gu. med. de Caracas* 1906 vol 17.

The author reports the results of 310 operations performed during a period of 22 months. The cases were divided into the following groups: head neck thorax abdomen genito-urinary apparatus perineum and rectum extremities.

Of 310 patients operated upon 30 died a mortality of 6.6 per cent. The general mortality in the surgical clinic was divided into two classes the pathological mortality and the operator mortality or those due to accidents or complications derived directly from the operation itself.

Of the 10 deaths 16 were pathologic and 14 operator or a pathologic mortality of 5.16 per cent and an operator mortality of 4.51 per cent.

The cases occurred in a general hospital the cases were not selected and some of the cases were in an advanced stage or their general condition on admission was very unsatisfactory.

RAOUL L. VILLAS.

Apert E.: Urticaria and Pseudo-Appendicitis. *M. d. med.* 1906 vol 105.

The acute forms of urticaria and sometimes also the chronic may give rise to an actual pseudo-peritoneal syndrome akin to that of purpura and polymorphous erythema possibly simulating appendicitis. Our present knowledge of the pathogenesis of urticaria enables us to understand what happens in such cases.

Since the works of Richet Arthus Leane Vidal and Joltrain it has been known that urticaria is an anaphylactic phenomenon and that the cutaneous troubles are only the outward and visible manifestations of sudden changes in the blood of what Vidal calls a *hémoclasie* or of a splitting up of the blood. The pseudoperitoneal phenomena testify to the existence of this state. The absence of the local signs of acute appendicitis the absence of rigidity of the abdominal wall and of localized skin hyperesthesia should prevent any confusion between an attack of appendicitis and the pseudoperitoneal attack associated with urticaria.

W. A. BRIDGES.

Gaucher: Unrecognized Syphilitic Lesions Surgically Operated as Cancers or as Local Tuberculous. (*Des lésions syphilitiques mal interprétées comme tumeurs*) *Ann. ot. rhin. laryng.* 1906 vol 15.

Thoracically the differences between syphilitic tuberculous and cancerous lesions appear to be so well established that in practice there should hardly be an error. Nevertheless the diagnosis is sometimes very difficult or at least it is very inaccurately made in a number of cases by surgeons who are experienced and well informed. Errors are oftenest observed in chancres gummatous infiltrations and in osseous and articular lesions.

The confusion of syphilis with local tuberculosis has very grave consequences particularly when it is a question of osseous or articular lesions. The author has frequently directed attention to the similarity of the suppurative osteitis and the osteo-arthritis of hereditary tertiary syphilis and tuberculous osteitis and arthropathies. Suppuration is not and cannot be admitted to be a distinct characteristic of tuberculosis. Hereditary osseous syphilis can be suppurative as well as osseous tuberculosis.

Not alone in the matter of hereditary syphilis are errors made but also in the white tumors in adults which result from acquired syphilis and which are frequently treated as white tuberculous tumors and operated as such.

The author mentions several cases which have come under his notice which corroborate his contentions. He therefore thinks that in all osseous or articular lesions which are apparently of tuberculous origin the Wassermann reaction should be looked for and mercurial treatment tried before surgery is resorted to.

W. A. BRIDGES.

HOSPITAL, MEDICOLEGAL, AND MEDICAL EDUCATION

The Duties of Medical Practitioners in Cases of Criminal Abortion *Brit M J* 9 6 1 306

The duties of medical practitioners in cases of criminal abortions are discussed in the original article. The question as to how far a medical man, who obtains in his professional capacity knowledge of the commission of a criminal offence, is in duty bound as a citizen to give information to the police authorities and so set the criminal law in action, is one which should be of great interest to the medical profession.

Probably the most frequent occurrence in which an opportunity of this kind might arise, is that of a medical man called in to attend a woman upon whom an illegal operation has been performed and in such a case under the decisions of the English Court cited in the article it is safe to say that the doctor is under no obligation to and indeed should not divulge the information which he has obtained in his professional capacity as it is of the highest importance that professional confidence should be respected and held inviolate. Quoting from an English case I doubt very much whether a doctor called in to assist a woman in procuring an abortion, for that in itself is a crime but for the purpose of attending her and giving her medical advice could be justified in reporting the facts to the public prosecutor. There might be cases when it is the obvious duty of a medical man to speak out and it would be monstrous thing for a medical man to screen a person going to him with a wound which it might be supposed had been inflicted in the course of a deadly struggle. The above is a quotation of Lord Brampton's remarks before the Royal College of Physicians of London in 1896.

In 1914 the English Courts had to deal with a case of an alleged illegal operation on a woman on whom three successive doctors had been attending. None of these doctors had given information to the police and there was consequently no evidence upon which to convict the prisoner who was

charged with having performed the illegal operation. The court in discussing the failure of the attending physician to report the matter stated: "No one would wish to see disturbed the confidential relations which exist between the medical man and his patient but there are cases, and it appears to me that this is one where the desire to preserve that confidence must be subordinated to the duty which is imposed on every good citizen to assist in the investigation of a crime. A time such as is here imputed to this man may be the moral duty of the medical man in cases where the patient is not dying or not likely to recover to communicate with the authorities when he sees good reason to believe that criminal offence has been committed."

The trend of the above discussion will be noted to be somewhat contrary to the previously cited, and holds that medical men are under the same moral duty as their brethren in all cases where they become aware of the commission of a crime to report it to the authorities. There are, however, different opinions when it comes to the attention of the British Medical Association caused it to appoint a committee to confer with the Lord Chief Justice upon this important question. This duty was received by the Lord Chief Justice on May 1, 1915 and the summary of the resolutions passed by the Royal College of Physicians of London in consequence of said interview is as follows: That a medical practitioner is not justified in disclosing information obtained in the course of professional attendance upon a woman who has her consent but that when he is convinced that a criminal abortion has been performed on his patient he should give her especially when she is likely to die, the information which may be taken as evidence against the person who has performed the operation provided always that her chances of recovery are not thereby prejudiced and that in the event of her refusal to make a statement he is under no legal obligation to talk for the sake of that the consent of the patient dying he should refuse to give a certificate of the cause of death and should communicate with the coroner.

JOS. A. CASTAGNOLA.

GYNECOLOGY

UTERUS

Goodwin, R. T.: Lacerated Cervix. *T. St. J. Med.* 910 xl 543

The author reviews the anatomy of the cervix, gives the most frequent symptoms of lacerations of the cervix, the results produced thereby, and concludes by discussing the operative treatment.

Lacerations of the cervix are very common. The chief cause of cervical tears is meddling obstetrics, for example, want of care or judgment in the use of forceps, premature rupture of the bag of waters, the injudicious use of the drugs ergot and pituitrin, mechanical dilatation of the cervix, and roughness in performing podalic version.

The symptoms are not pathognomonic and are due to the lesions caused by the laceration. The most constant of these secondary conditions are subinvolution of the uterus, endometritis, and uterine displacements, and the symptoms usually described as being due to lacerations of the cervix are in reality caused by one or all of these complications. Backache, bearing down in the pelvis, vertical headache, leucorrhoea, menorrhagia, metrorrhagia, sterility, and abortion are the most frequent of these symptoms.

The results of the lacerations are either immediate or remote. Of the immediate results the most frequently observed are hemorrhage, sepsis, and vesicovaginal fistula. The principal remote results are subinvolution of the uterus, chronic endometritis, uterine displacements due to subinvolution or to contractions of cicatricial tissue in the cellular structures behind the uterus, chronic tubal and ovarian disease, and cancer.

As a large number of lacerations require no treatment whatever, it is important to have a clear and definite idea as to what class of cases require operative interference.

The following rules have been formulated for this purpose:

1. Operate upon all lacerations which are complicated with induration and hypertrophy of the cervical tissues, eversion of the intracervical mucous membrane, cystic degeneration, and erosion.

2. Operate upon all lacerations which are responsible for subinvolution of the uterus, endometritis, and uterine displacements.

3. Operate upon all lacerations which are associated with a sensitive plug of scar tissue in the angle of the wound.

Any grave pelvic disease is a contra-indication for operative interference in laceration of the cervix. There is always considerable dragging upon the uterus during an operation upon the cervix, and

these manipulations may cause a fatal peritonitis by breaking up of adhesions. RALPH H. KULS.

Percy, J. F.: The Problem of Heat as a Method of Treatment in Inoperable Uterine Carcinoma. *T. St. J. Med.* 910 xl 543

There are three stages to be recognized in the development of cautery treatment of carcinoma of the uterus: (1) that in which it is used merely to stop hemorrhage and limit offensive discharge; (2) in the galvanocautery excision of the cervix, uteri developed by the late Dr. John Byrne of Brooklyn. (In this technique a degree of heat sufficient to cut the tissues was used); (3) in the dissemination of a coagulating degree of heat through the widest area possible of the cancer mass, with no attempt at immediate excision of the parts (Percy).

The technique of Byrne was not designed for advanced inoperable cancer in which the uterovaginal junction is fixed with extensive malignant and inflammatory infiltration of both broad ligaments and the perimetrium. As classified today, Byrne operated only in the first steps of cervical cancer involvement. He deplored the use of the cold steel knife in cervical cancer and forty-four years ago referred to it as a comparatively fruitless procedure at best. This is just as true today — without the preliminary use of heat — as it was in his day. The cases treated by Byrne with galvanocautery excision of the cervix were the type of cases which would be considered suitable for the Reis-Wertheim treatment of today.

The author has the following to say as to the future of the heat treatment. The stage of operability with my present technique is easily overestimated and I confidently expect that if the promise which I see in my work is realized in the further development of the use of heat in cancer, the stage of operability will be without limit in strictly pelvic cancer. I would not have you believe, however, that the ideal is mere operability. Back of it all is the hope and promise of results never before obtained by any method so far developed in that disease, which has always stood as a synonym for incurable pelvic cancer. In conclusion permit me to re-emphasize the following points:

1. The Percy technique so-called is not a cautery operation. I remove nothing. The tissues following the application of moderately low degrees of heat are literally coagulated and slowly dissolve. It usually takes two weeks for a healthy granulating surface to appear beneath the gradually dissolving mass of inert cancer debris.

3 "The operation of Byrne was a high galvanocautery incision of the cervix. There could be but little penetration of heat. Byrne recognized this when he advised that the surface left after the removal of the gross mass be sealed over with the cautery knife in order to get all the heat penetration possible. But Byrne never thought of applying heat to the degree of obtaining penetration sufficient to render movable the fixed tissues in the pelvic basin. If the fixed tissues are malignant and inflammatory are not made freely movable as they are normally the heat penetration has not been sufficient and, therefore, is ineffective.

3 "To coagulate a large mass of uterine cancer equires from thirty to sixty minutes, and if the broad ligaments still remain still fixed an additional ten minutes.

4. In my effort to emphasize the importance of avoiding the burning temperatures, I fear that I have led many surgeons to the opposite extreme.

I said that they are trying to destroy the activity of an inoperable mass of cancer with temperatures so low that days, rather than hours, would be required to make the heat effective. Byrne fried his tissues. I broiled or pasteurized them. The Byrne technique was based on the use of heat as a acute process. Mine is not acute, but chronic, both as to time and degree. Heat more heat and yet more heat but heat, not fire broiling nor frying nor roasting but curdling pasteurization, not desiccation coagulation, not carbonization.

In its practical application, the whole technique can be summed up in one statement. Do not carbonize the tissues. For in the degree that this is done in that degree is heat penetration inhibited and heat penetration is the vitally essential thing. A gentle simmering sound only should be heard when the ear is placed near the vaginal water-cooled speculum. This simmering sound is produced by a temperature above 45° C (113° F). It probably ranges from 83 to 95° C (180 to 200° F). Heat in the cancer operable or inoperable or as preliminary to the use of the cold steel knife has, with its present development come to stay. It offers more in the way of cure in the early case than any other treatment so far devised. In the late case it promises success from suffering with prolongation of life that is most hopeful.

But more than all else we have not yet fully learned the technique of most effectively destroying cancer in the accessible regions of the body by heat. When we read another chapter will have been written in the history of man's contest with his physical ills that will compare very favorably with anything so far accomplished along the lines of scientific endeavor.

Ramsohoff J. and J. L. Radtke. Treatment of Uterine Fibroids. *Lancet-Cl* 9655 6

The authors believe that radium is the method of choice in the treatment of complicated terine fibroids as the treatment is safe and in the usual

use the symptomatic are almost certain. It should not be used where there is reasonable doubt of the diagnosis, or where the fibroid is complicated by infections of the tubes and ovaries.

Operation should also be the method of choice when pressure symptoms are so acute as to demand immediate relief.

Radium treatment is superior to X-ray treatment because the radium is brought into intimate contact with the fibroid itself. It does not depend on penetration of the rays.

Five typical cases are cited. On particularly interesting case was that of fibroid in a woman past the menopause, occupying the entire pelvis and extending 2 inches above the umbilicus. Under treatment the multiple disappearance of the tumor as secured. Operation thus case would have been feasible because of the presence of a large nucleus of the tumor of the aorta.

Condit W. H. Compensatory Vascular Ectopia Menstruation Nematoma Menstrua Dent 157 102 157 102

The author reports the interesting case of a young woman who had bystectomy and bilateral salpingo-oophorectomy yet 18 months had the subjective symptoms and sensation which had characterized her previous menstrual periods and had hemorrhaging at some of her cutaneous tissues. Fifteen days after the operation the regular menstruation she had hemorrhaging to the nerve the use of splints treated over the left ninth intercostal space. It increased the size of a hen egg and there occurred considerable ecchymosis in the skin about the area. Four days after the tumor subsided in one half and soon the skin ecchymosis disappeared. No blood escaped from the tumor or skin. The process was repeated regularly every twenty-eight to thirty-four days for twenty-one months. At the time the tumor was which had gradually formed ruptured and he last consented to operation. Microscopic sections were negative for melanoma.

At the next regular period the left mammary gland was attacked in a similar manner but after one year the manifestations in this gland became less frequent and regular and at the end of two years it had returned to practically its normal appearance. The author now hoped that relief had come but she then had an extensive cutaneous hemorrhage into the extensor surface of both legs, accompanied by painful extreme ecchymosis from the thighs to the knees. Similar attacks occurred in one leg thirty-four days later and were repeated each month. The last attack occurred in July 1914 seven years and three months after the operation. It involved the posterior surface of the right leg from the gluteal fold to the ankle being most marked over the popliteal space.

The conclusion arrived at in this study is that menstrual abnormalities or irregularities are due to blood pressure changes of the individual together

with some atrophic or pathological changes in part or parts where the hemorrhage manifested itself. In the particular case reported the peculiar demonstrations were brought about by a failure of the individual physical economy to adapt or adjust itself to the change brought about in the blood pressure by removal of part or parts previously acting as the safety valve of this particular economy.

(H. D. V.)

Lange S. Recent Results in the X-Ray Treatment of Menorrhagia, Dysmenorrhoea, and Uterine Myoma. *Am J Roentgenol* 9

Lange's paper is based upon 60 consecutive cases of menorrhagia, dysmenorrhoea and uterine fibroid treated by X-ray therapy. In every case a satisfactory result was achieved and artificial menopause apparently permanent occurring in every case in which it was desired, regardless of the age of the patient. These cases were referred from many different sources and while only ordinary care and skill were employed in their selection, malignancy had not developed in any case either during or following the treatment. So far as he has been able to follow the case there has been no recurrence of the menstruation after it has once stopped. In several cases there has been an occasional transient menstruation during the last month just following the menopause. After a lapse of ten months, however, abatement of the ovarian function has been complete and permanent. He has concluded to be a safe working rule that if never missed the treatment may be discontinued.

In this series of 60 cases, 3 were treated because of persistent menorrhagia. The ages of the patients varied from sixteen to fifty years. The minimum of X-ray radiation required to bring about permanent menopause was one treatment of 600 X in a woman forty-nine. The greatest amount given any patient was 600 X (eight treatment) which was required to abolish the ovarian function in a girl of twenty. Another patient of seventeen years of age required only 600 X to accomplish the same result. A woman of twenty-eight required 600 X (six treatment). A woman of thirty-two required 600 X. With increase in the age of the patients the amount of X-ray radiation required rapidly decreases.

The equipment consisted of a Coolidge tube backing up a spark gap of nine to nine and one-half inches and a filter consisting of 3 mm. of aluminum and a thick layer of soft lead. With target distance of six inches, 10 milliamperes are passed for 2.5 minutes (over 20 X) through each of four areas or about 100 X for each treatment.

Within a month Lange would give three or four treatment, but in a footnote concedes the possibility of an error in his knob reading and that other operators would use an interval of three weeks between treatments. (A caution the unskilled practitioner would follow it could be entirely.)

(D. J. R. B.)

Collins A. S. A. W. An Operation for Retrodisplacement of the Uterus. *Is.*

The uterus is held in a retroflexed position and ligaments are caught with a wire for pulling up with the median line and the uterus is held in a normal position.

A ligament is then placed in the position of the uterus and the uterus is then held in a normal position. The uterus is then held in a normal position and the ligament is then placed in the position of the uterus and the uterus is then held in a normal position.

A ligament is then placed in the position of the uterus and the uterus is then held in a normal position. The uterus is then held in a normal position and the ligament is then placed in the position of the uterus and the uterus is then held in a normal position.

It is a muscle-to-muscle attachment and is possible to pull down the uterus and the uterus is then held in a normal position. The uterus is then held in a normal position and the ligament is then placed in the position of the uterus and the uterus is then held in a normal position.

A bladder or other organ is then placed in the position of the uterus and the uterus is then held in a normal position.

The uterus remains mobile.

(F. Ward L. C.)

Handfield Jones M. Clinical Aspect of the Double Uterus in Its Relation to Diagnosis and Treatment. *Lancet* 1914

The paper is based on the report of 10 cases of this condition 5 of which are under the author's observation. The cases are selected to illustrate certain clinical points. Among them were: 1. Case in which septum intervened between the second and third uterus occurred after delivery of a child from the third uterus. 2. Case in which the fetal sacs were removed from the uterus of the patient safely carried to term a single pregnancy in the second uterus. 3. Case of hamman-Rich in a double uterus. 4. Case illustrating the possibility of delivery by the unimpregnated uterus of a double uterus. 5. Case in which the unimpregnated uterus was safely delivered of the way of the pregnant portion and delivered. 6. Case in which death occurred from sepsis and hemorrhage following an attempt to lift the septum separating the two uteri both of which were pregnant after the first uterus had been safely delivered. 7. Case in which a pregnancy of 10 to 11 months on the left of a double uterus after

the other uterus had been emptied by curettage in the early months (8) a case in which a double vagina was discovered by the patient herself and (9) a case in which pregnancy proceeded safely to term after the condition had been demonstrated by an exploratory laparotomy in the early months of pregnancy C D HARRIS

Gallant A. E. The Removal of the Troublesome Useless Uterus. 4 1 11 5 9 6 ch, 455

Eliminating hysterectomies for (1) life-destroying disease and (2) for conditions detrimental to health or dangerous to life, the author goes on to the consideration of (3) removal of the uterus because of conditions the source and cause of health-destroying discomfort—troublesome because they were the cause of intractable suffering—useless because they were either absolutely relatively or practically incapable of performing the one sole function of the uterus—reproduction. In 2 women between 57 and 73 years, who had ceased to menstruate, the senile uteri were removed because of prolapsed bladder with or without rectocele or descent of the uterus or intestines, in 7 cases uterosacral ligament retrofixation, 4 cases chronic pyometria and ovarian sarcoma (?) one case. The second group included 1 woman whose ages ranged from 37 to 47 years, and who were still menstruating. Four had passed the approximate age for the menopause from 2 to 11 years while the other 7 still had in prospect from one to five years longer to flow normally. The average range of fertility was from one to seven children, the most recent birth seven months previous to operation, the average length of sterility was between six and seven years.

The third group included 7 suffering women between 30 and 34 years, in the full tide of reproductive activity, who had not been benefited by local and general treatment or by conservative operations.

Gallant, when deciding to operate or not to operate was influenced largely, by (1) the severity of the symptoms, (2) the effect on the general health and (3) the environment. Excessive nervousness was the one predominating complaint in all but one instance. Dysmenorrhea came next in order of frequency usually of a severe type lasting throughout the flow and compelling the sufferer to lie down for a few hours or go to bed for one, two or even three days of each period. Backache was a very common symptom, located by placing the hands over the sacral region, variously described as come and go pain, dragging, tearing, bearing down, falling, and present all the time during the monthlies, not so bad between, etc., but to each one very trying and very real. Headache, suboccipital was present in over half the cases, and of a truly torturing variety relieved only by some sort of dope. Ilio-abdominal pain, when not of appendicular origin was of a dragging, tearing, burning character and referable

(tension on the round ligaments or enlargement or adhesions of the tubes and ovaries, distinguishable from the appendix only by actual palpation. Dyspareunia was present whenever the vagina was raw or the uterosacral ligament immobilized the uterus.

Dysuria with frequent painful urination was nearly always associated with a demonstrable trigonitis, an acid vaginitis, and acid urine of high specific gravity.

The conditions calling for operation were prolapsed bladder with or without prolapse of the uterus and rectum, 1 case retroversion, 7 cases uterine fixation, 16 cases hypertrophied uterus, 5 cases anteversion, 4 cases lacerated cervix, 6 cases perineum, 1 case diseased ovaries and tubes, 6 cases persistent vaginitis, 6 cases with gonorrhea, 3 cases visceropeliosis cases.

The operative measures employed were vaginal hysterectomy 9 times, with salpingo-oophorectomy 1 case, complete excision of vagina, 3 cases partial excision, 4 cases supravaginal, 4 cases with ovaries and tubes, case belowinovaginal pain cases abdominal pain 2 cases anterior colporrhaphy 2 times perineorrhaphy 6 times appendectomy 4 times uterine drainage, times drainage through the cervical stump, times conservative (?) amputation of cervix, 2 times resection of sigmoid 1 case. This last patient died on the fifth day after operation, presumably from rupture of the slit of the resectum brought about by her (conscious if not) voiding into the bed. One other died 8 days after complete loss of the vagina from hypostatic pneumonia.

In conclusion Gallant states his belief that removal of the troublesome useless uterus is not only justifiable but the most rational procedure in the following conditions:

1. In senile women, complete denudation and closure of the vaginal canal is the one sure and permanent means of curing hernial vaginas.

2. Well-nourished women who have ceased to menstruate and who have passed or are approaching the approximate age when the menses should cease hysterectomy and partial colectomy will prove beneficial and still provide for marital relations.

3. Menstruating women under thirty-five years, after every means to conserve childbearing function have been exhausted when the conditions cause ill of semi-invalidism when they prevent her from working and earning a livelihood when they seriously interfere with her duties to her husband and children and condemn her to a life of unalloyed suffering, then and then only as a last resort, should the uterus be removed.

4. Whenever the pelvic conditions are associated with a troublesome, colicky appendix, or simple or exophthalmic goiter they should be removed.

5. Whenever combined with visceropeliosis a cure cannot be expected unless the patient is fitted with an appropriate corset.



Fig. 1

Fig. 1. Section from the interior of the nodular area within the ovary showing bone lamellae, Haversian canals and bone marrow (Moschcowitz).

Fig. 2. Low power section taken near the periphery of the bony nodule. Space within the lime-containing

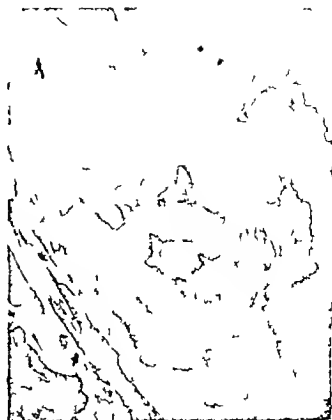


Fig. 2

area filled with delicate fibrous tissue, fibroblast and new blood vessels. Along the circumference of these primary fibroblasts which have penetrated into the surrounding lime-staining tissue reveals a marked lime absorption (Moschcowitz).

ADNEXAL AND PERIUTERINE CONDITIONS

Moschcowitz, E: The Relation of Angiogenesis to Ossification Based upon the Study of Five Cases of Calcification and Ossification of the Ovary. *Bull. Johns Hopkins Hosp.* 1916, vol. 21.

Within a comparatively short time the author has been able to study in the pathological laboratory of the Beth Israel Hospital three cases of calcification and two of ossification of the ovary. The lesions were studied particularly from a morphological viewpoint. The process in each instance involved a corpus albicans. The specimens represented an apparently continuous series in which four stages were recognizable: (1) an early discrete multiple deposit within a healed corpus luteum; (2) a definitely circumscribed deposit of amorphous lime within a corpus albicans; (3) the formation of primary Haversian canals which is accomplished by the genesis of an active mesoblastic tissue both upon the surface and within the interior of such a circumscribed lime deposit. (This mesoblastic tissue is derived from the adjacent blood vessels of the ovary, and the predominant activity is the development of new blood vessels associated with this

activity; the development of osteoblasts from the mesenchymal cells); (4) true bone formation with maturation of all the elements described above, together with eccentric deposition of bone plates around the primary Haversian canals and the formation of marrow.

Moschcowitz states that the development of new blood vessels affords the keynote to the interpretation, in terms of cellular ontogeny, of the process of ossification and that the histological constituents which enter into the formation of new blood vessels are the progenitors of all the histological components of osseous tissue. In other words, that blood vessels, osteoblasts, bone cells and marrow (in part at least) are merely differentiations of the mesenchymal cell unit.

To his mind the author's specimens furnish strong corroboration of the adaptive or mesenchymal theory of angiogenesis, and to the theory of the non-specificity of endothelium. Ossification, he believes, does not occur without preliminary calcification, and calcification occurs only in dead tissues, and there is no explanation for regarding bony structures within the ovary as blastomata.

(F. I. B. L.)

but syphilis if present will exert an influence of its own upon coexistent diseases. Moreover latent syphilis prevails more in women than in men.

The course of syphilis in men differs in many points from that in women. To cite but one of the differences the relative frequency of testes and paresis in the two sexes is well known.

Syphilis of the internal genitalia in women presents a number of problems as yet unsolved. The question of infection by the spirocheta of a syphilitic man is discussed, also the possibility of differences in the strains of spirochetæ which might have a predilection for one part or the other of the female genital tract. There is finally the question whether certain parts of the genitalia possess a sort of relative immunity.

Primary chancre of the vagina is rare probably because of certain histologic and biologic characteristics of the vagina. The typical signs of disease of a mucous membrane like parient-like induration persist as a rule only for a short time. Under ordinary circumstances spontaneous resorption occurs after about two weeks. The absence of definite symptoms such as pain or vaginal discharge and the insignificance of any remaining scar probably result in many cases in failure or even inability to correctly diagnose this lesion.

Secondary syphilitic lesions of the vagina are very rare. They occur either in the form of macules or papules the latter variety seems to be relatively more frequent. They have no symptomatology of their own and therefore are discovered only accidentally during an examination with the speculum.

Tertiary luetic manifestations of the vagina are also extremely rare. They represent as a rule the continuation of secondary lesions in the vulva, uterus or adjoining organs. The isolated submucous gumma breaks down early and appears in the form of a more or less characteristic ulcer. The more destructive processes which eventually lead to the formation of fistula and strictures almost always originate in structures surrounding the vagina. Tertiary lesions of the vagina do not exhibit characteristic symptoms such as pain or discharge.

Primary chancre of the cervix represents the best known and most common type of syphilitic affections of the female internal genitalia. Its frequency has probably been overestimated. Statistics based on a large number of observations have never shown a frequency of over 15 per cent of all primary chancres found on the genitalia. It must however be admitted that in a considerable number of cases its presence on the vaginal portion of the cervix is overlooked.

Primary chancre of the cervix does not give rise to any noteworthy clinical symptoms. Therefore as a rule a search for it is made only after the appearance of the secondary exanthema. Under normal conditions the primary lesion heals with such rapidity that its existence in a large percentage of

cases can only be surmised from certain findings which in themselves are not characteristic.

Not even during its existence does the primary chancre of the cervix truly characterize its pathognomonic aspect on account of its rapid and varied evolution from an unroofed inflammation to an ulcer which in turn either heals quickly or transforms into an inoperable carcinoma.

Concerning the absence of palpal swelling but especially the difficulty of ascertaining the characteristic induration of its base a description looking somewhat like an abscess of the cervix is not infrequently met with. The spirocheta pallida is never found in it and it is followed by a typical secondary exanthema.

Eight personal observations have been cited by the authors to the few cases found in the literature of a secondary lesion of the cervix. Syphilis manifested itself upon the cervix in the form of macules, papules and ulcerations. These forms probably represent three successive stages in the development of a lesion caused by scattered accumulation of the spirocheta pallida in the squamous mucosa of the cervix. The parasite can readily be recovered from the secretion of any of the three forms and thus explain the great infectiousness of secondary lesions. Wassermann is positive in this stage. Macules and papules have no symptomatology of their own while ulcers may give rise to a profuse yellowish discharge. Occasionally a peculiar puffiness of the fornices may be present. The leucoplasic appearance of macules, the characteristic form of the papules and the typical yellowish color of the ulceration render diagnosis comparatively easy. Secondaries in other parts of the body form a valuable aid. Cervical lesions as a rule heal quickly and may disappear without leaving any traces. Specific treatment energetically applied brings about resolution in a very short time.

Actual knowledge concerning syphilitic lesions of the uterine body is extremely meager. Primary and secondary manifestations have not yet been observed in the uterus. A few instances of gumma in the uterine wall have been recorded. An isolated observation by Hoffmann proves the possibility of gummatous changes in the endometrium. This infrequency of tertiary lesions is a matter of surprise for the uterus more than any other internal organ of the body is exposed to direct infection. Spirochetæ may reach the uterine cavity from the vagina or lesions of the cervix. It is certain that an actively syphilitic mother invariably infects the fetus. In every pregnant syphilitic woman spirochetæ must be present in the endometrium. Unless syphilitic lesions of the uterus have been overlooked in the past we are forced to assume a relative immunity on the part of the uterus.

It seems possible that the tubes may be the seat of luetic lesions but the pathological and clinical material on record is yet too incomplete to permit of positive assertion. Spirochetæ have never been found in the tubes of syphilitic women.

Various changes in the ovaries (simple enlargement syphilitic oophoritis, tertiary sclerosis of the ovary ovarian gumma) have been described as typical expressions of the secondary and tertiary stages of luetic infections, but in no instance with the possible exception of H. S. Mann's case, has positive proof been furnished that such alterations are actually due to a local luetic process.

The fact that in some syphilitic patients either an amenorrhea or more commonly a metrorrhagia, disappears after specific medication cannot be accepted as evidence of a syphilitic ovarian lesion. Spirochetes have as yet not been demonstrated in the ovaries of adults.

Syphilis of the pelvic cellular tissue appears in the form of a diffuse gummatous infiltration which secondarily involves the pelvic peritoneum. To the few cases on record the authors have added personal observation. In almost all instances a wrong diagnosis of malignancy has been made. In their own case the positive outcome of the Wassermann reaction together with other unmistakable signs of tertiary syphilis about the outer genitals aided in arriving at the correct diagnosis. Specific treatment produces amazingly quick improvement of an apparently hopeless condition.

Syphilis may be the causative factor of disturbed menstrual function for various reasons. Impairment of general health and disorder in the harmonious synergism of all endocrine glands through the affection of one may in the course of a luetic infection interfere with normal ovarian activity. Therefore, in syphilitic patients specific medication may correct a menorrhagia or metrorrhagia which has proved refractory to the customary modes of treatment. Such prompt therapeutic effect, however, does not permit of a diagnosis of luetic processes in the uterus or in the ovaries, because uterine lesions probably never, and syphilitic ovarian lesions, if actually existing, are but rarely responsible for abnormal uterine hemorrhages.

The Wassermann reaction is found positive in a very large percentage of patients suffering from metrorrhagias. This is not surprising. Luetic women through the common complication with gonorrhea and as the result of frequent abortions are particularly prone to develop gynecologic anomalies in which irregular uterine hemorrhages represent a predominant symptom.

The authors recommend a trial with specific therapy before radical treatment is decided upon for all cases in which a uterine hemorrhage is not definitely explained by local findings.

Normal cervical secretions may contain spirochetes during the secondary stage even though there are no specific lesions about the genitalia. This has been definitely proved by the authors by actual observation. The search for spirochetes may become as important a part of our diagnostic technique as is the stain for gonococci. The prognosis as to the danger from infection as well as the time of cure may depend upon such an examination.

As regards the uterus and more particularly the cervix convincing proof of the interrelations of syphilis and cancer are meager and it is necessary for the present at least, to rely chiefly on the analogy with other regions of the body. The following four possibilities suggest themselves.

1. An iteration of all tissues of the body caused directly or indirectly by the syphilitic virus—*Gonorrhea* *mitis* *g* of Neisser—whereby the defensive apparatus of the organism is weakened.

2. Any part of the body which in the past has been the seat of a syphilitic lesion becomes a *locus in quo* *istius* wherein cancer may develop.

3. Leucoplakia may represent the connecting link between syphilis and cancer.

4. The direct transition of syphilitic into carcinomatous tissue.

Microscopic sections are produced to illustrate the probable mode of such transformation. Unless arrested in time by antiluetic treatment, atypical cell proliferation such as is stimulated by the syphilitic lesion may lead to carcinoma.

While actual and well established facts regarding syphilis of the female genital organs are comparatively few in number in contrast to the many theories and the volume of literature on this subject yet enough is known to compel and hold the interest of the gynecologist.

Syphilis may cause organic lesions in all parts of the genital tract such as ulcerations and tumorizations. The gynecologist will be able to properly interpret and treat such lesions only if he is familiar with the local pathology of syphilis. He may also meet with functional disturbances within the genital sphere or explainable by any local findings, which may be due directly or indirectly to the influence of syphilis.

There are close analogies between the genital organs in the male and the female from a purely developmental and anatomical point of view. The fact that the ovaries correspond to the testicles, the tube to the epididymis, the uterus to the prostate has seemed to many writers sufficient to base deductions as to the pathology of syphilitic lesions in the female upon their knowledge of luetic lesions in the male. Such reasoning is faulty. Syphilis in many respects affects woman in a manner essentially different from man. After all, there is nothing in man to compare with disturbances of menstrual function which so often confront the gynecologist.

Gynecology has in the past profited by the pioneer work of dermatology in the realm of syphilis. It is now time that the gynecologist should contribute his full share. There are still many mooted questions, such as syphilis without primary lesion or the pathology of local lesions in the female genital tract which the gynecologist is amply fitted to solve.

He should also fall in line with the representatives of other specialties in advancing the problem of the relationship between cancer and previous syphilitic lesions in the same locality.

Familiarity with syphilis lesions in the genital tract must needs prove of eminent practical value to the gynecologist in view of the frequent confusion in the diagnosis of cancer and syphilitic ulceration, or gummata. That occasionally a patient is subjected to a serious radical operation which will have been cured by antiluetic treatment there can be no doubt.

A more intimate interest in the problems of syphilis of the internal female genitalia will advance gynecology both in its theory and in its practice.

MISCELLANEOUS

Coffey R. C. Surgical Treatment of Gonorrheal Tube Infection with a Quarantine Pack.
S. G. M. (Oct. 13)

The author emphasizes the importance of differentiating gonorrheal from pyogenic tube infection, for in the former the tube once sealed rarely functions, while in the latter pyogenic infection most tubes may be restored to function by proper drainage. The pack is made by laying wicks all the way across the pelvis in a complete wall the wicks extending to the bottom of the pelvis and protruding through the abdominal wound. Above this pack of gauze wicks four thicknesses of gutta percha tissue in the form of a large sheet is used to protect the intestine from contact with the gauze.

During the past eight years more than fifty cases of gonorrheal tube infection have been operated upon in the very acute stage with no mortality. In four of these the operation was performed so early that the tube had not sealed but a considerable quantity of pus could be squeezed out of the tube. The quarantine pack was placed, attacked, cut short, and in no instance has the patient had trouble since. In two other cases where the tubes were firmly sealed the tubes were ligated and a stump left. In both instances it was necessary to do a second operation to remove the stumps. In all other cases excision of the uterine end was practiced, followed by the placing of the quarantine pack. In all cases the attack was cut short at

and in none of this group of cases has a second operation been necessary.

The author's conclusions are: 1. Acute violent infection are best treated by early and radical operation.

2. If the tubes have not firmly sealed, the patient should be quarantined with a pack and allowed to remain unharmed. If they are firmly sealed they should be excised and hysterectomy and ovaries isolated from the intestine by a quarantine pack.

The author believes that many more tube infections will be saved by this method than by the old conservative method and that the usual sequel following gonorrheal tube infection will be markedly decreased.

Leeuwen G. A. Van. Some Remarks Regarding Useless, Therefore Undesirable Operations. *Quelques remarques à propos de opérations inutiles (ou indésirables)*. *J. h. m. s. d. b. j. n.* 1907. 333.

Many hysterical women in whom the genital apparatus is absolutely normal consult gynecologists for pains in the lower abdomen which they refer to the uterus or adnexa. In many such the indicated diagnosis is—no genital anomaly, hysteria.

In examining such women who have come to the gynecological clinic in Amsterdam Van Leeuwen found in a great number a cicatrix of a former appendicectomy. He found that the result of such operation was favorable in 40 per cent of cases but unfavorable in 60 per cent. The unfavorable results were generally in cases of chronic appendicitis.

Diagnosis of chronic appendicitis is difficult especially in women yet it is often made without sufficient reason. It is confounded very often with hysterical pains and anomalies. The operation which is done on these hysterical subjects is naturally insufficient. It is even harmful because since operation has failed to relieve them of imaginary pain they will now believe that there is something abnormal in their lower abdomen.

Such operations based on wrong diagnosis are not only damaging to the patient but to medical science.

W. A. BRON.

OBSTETRICS

PREGNANCY AND ITS COMPLICATIONS

Van Slyke, L. and Vinograd Villichur. A Quantitative Test of the Abderhalden Reaction. *Am J Obst N Y* 9 6 1041 90

Owing to the great uncertainty which has been associated with the Abderhalden reaction the authors have worked in the hope of providing a quantitative method sufficiently accurate, simple and specific for proteolysis to make the results definite and free from subjective influence. They confined themselves to study of pregnant with normal serum. They utilized placenta prepared in three different ways.

As a standard method for measurement of serum protease the ammonium nitrogen determination seemed to them particularly promising for the following reasons. First it is quantitative and permits accurate results with a small amount of material. Second, it is specific for proteolysis. The change of the non-ammonium nitrogen of proteins into ammonium nitrogen is characteristic of protein digestion and the extent of this change affords a direct and quantitative measure of the extent to which protein digestion occurs. The method since its publication in 1910 has been used successfully in studies of protein digestion by various investigators.

As nearly as possible the same amount of placental tissue was used in every case. The utmost care was taken to avoid bacterial contamination, and the technique was controlled by means of repeated cultures with negative result. The chemical manipulations were simple, clear-cut, and quantitative. Duplicate controls always gave closely agreeing results.

Practically every serum, whether from a pregnant or non-pregnant individual showed some definitely measurable degree of digestion when incubated with placental tissue. The range of individual variation in proteolytic activity was wide. The result with normal sera cover in each case a range which includes most of the result from pregnant sera. After years' work using the utmost care, the authors found that the individual variations of both pregnant and non-pregnant sera make the results from both overlap so completely as to render the utilization of the reaction even with a quantitative technique absolutely impracticable for either a positive or negative diagnosis even of pregnancy.

C. H. D. VII.

Evans, D. J. Eclampsia. *Cad M Ass J* 9 6 VI, 0.

The author is of the opinion that true eclampsia is, on the whole, a rather rare complication of pregnancy and that a preponderant proportion of cases

diagnosed as eclampsia are really cases of renal insufficiency or nephritis in other words that in the larger proportion of cases the toxemia is due primarily to defective kidneys, while in the remainder the hepatic type the renal involvement is purely secondary. That it is possible to make a diagnosis of true eclampsia during life is thus open to question.

As a general rule, toxemia occurring late in pregnancy is attended with a marked increase in the general blood-pressure. In all cases of pregnancy presenting signs or symptoms of toxemia, the blood pressure should be systematically observed. A rising blood pressure associated with the symptoms headache, constipation, redness, epigastric pain, disturbed vision, albuminuria, etc. are indicative of danger and a pressure of 5 mm. may be considered as the danger limit.

As regards treatment every individual case must be studied and no single method of treatment is applicable to all.

In the presence of evident symptoms of toxemia in the later months of pregnancy associated with albuminuria and casts and an increased blood pressure, eliminative and sedative treatment is indicated. One must rely on milk diet, hot baths, the copious use of fluids and purgatives, together with rest in bed to bring about improvement. If there be no improvement indicated by the subsidence of the albuminuria, redness of blood pressure and disappearance of the general symptoms of toxemia, then labor should be induced. Venesection, sweating, the employment of morphia and chloral in moderate doses, with purgation and the free use of fluids, constitute the treatment of a case of actual convulsions. In cases at or near term active surgical methods of delivery may be undertaken, but only to save the life of the child as such operations, unless attended with considerable hemorrhage, seem to have but little influence in relieving the condition of the mother. EDWARD L. COYNE.

Diel, H. E. Eclampsia; Studies Concerning Its Causes, Nature, and Treatment. *N Eng M Gaz* 9 6 II, 7

As a general average eclampsia occurs in 0.3 to 0.6 per cent of all cases of confinement, 20 per cent coming antepartum, 60 per cent during labor and 20 per cent puerperal. The general predisposing causes seem to be primarily hereditary contracted pelvis, multiple pregnancy, previous renal or hepatic disease, and an unstable nervous equilibrium. Properly speaking eclampsia is but one, of the most severe as well, of the toxemias of pregnancy.

The author reviews the various theories as to the

cause of eclampsia and on July 1 that all cases probably do not have the same origin.

At present and until the cause be specially known the treatment is still but an a matter of routine.

First however there are the preventive measures. Symptom suggestive of impending eclampsia are headache, nausea, vomiting, seeing spots before the eyes with blurred vision, epigastric pain, insomnia or an abnormal desire to sleep, two things, edema, high blood pressure and albuminuria. When such symptoms are present, dietary measures should be taken—especially avoiding fritters and food rich in cellulose, also attention must be given to the eliminative channels. If these do not suffice, premature induction of labor is decidedly called for.

After convulsions have occurred there are two methods of treatment: (1) to deliver the patient once (2) delivery in case but attempting to control convulsions by the administration of morphine or chloral, birth and vivisection.

Remove toxic material by any rational means possible, relieving the same by saline intravenously or by colonic irrigations. Assist labor when it is developing or when the patient's condition does not improve.

If actual operative measures are needed, provided there be no dilatation of the cervix, the choice of methods rests between abdominal caesarean section, vaginal caesarean section and instrumental dilatation of the cervix. Vaginal caesarean section seems to offer the best chance for the mother in that it seems to involve the least shock and the least chance of sepsis. C. D. H. Livi.

Rand F H Indications for the Advantages of the High Incision in Caesarean Section J M S I M I 96 1170

The author gives the following indications for caesarean section:

Absolute indications i.e. conditions which admit of no other means of delivery: (1) contracted pelvis, as a flat pelvis where the true conjugate is less than 7 cm. and the child normal in size (2) neoplasms of the pelvis, uterus, adnexa, cervix, vagina, rectum, if sufficient to cause obstruction to the birth canal so that a normal birth is prevented (3) additional indications: cicatrices of the vagina, or cervix, some cases of ventral fixation, ruptured uterus, tonically contracted uterus, accidental hemorrhage (4) eclampsia—by this method of treatment the maternal mortality has been reduced nearly one half (5) placenta previa is thus best treated as it offers the best chance for both mother and child (6) condition of the fetus—one with a non-moulding head, impacted breech or face or prolapse of the cord where infection has been a hindrance.

Relative indications These are cases where caesarean section vies with forceps delivery, podalic version, pubiotomy, accouchement force, etc. Such cases include pelvic deformity, certain cases of

placenta previa, tonically contracted of the uterus, and in multiple cases, for morbid conditions where the fetus is alone in the interest of the child or to save the mother's life.

Relative indications (1) when attempts at delivery have been made from below (2) when it is possible that vaginal examination has been made with disastrous precautions.

Operative (1) Choice of time to operate. It is best to wait until labor has begun to be uterine, but not too late. However, in large perineal operations, the operation is an emergency, perineal. A high incision in the uterus is indicated in a living birth following reasons: (1) the abdominal opening is smaller than in the low type of incision (2) abdominal and uterine wound are separated by contraction and involution of the uterus which lessens the chance of adhesions (3) uterine incision is made through the part of the organ away from the lower blood vessels which lessens the danger of hemorrhage (4) incision is made in a portion of the uterus less likely to rupture in future pregnancies (5) there is less escape of intestines and omentum which lessens the shock and post-operative disturbances (6) there is less probability of subsequent hernia. C. D. H. Livi.

Bell R G Caesarean Section in a Pitman's Cottage B I M J 96 1195

The author reports a caesarean section performed under unusual difficulties in a case of contracted pelvis. The two previous labors had ended in the sacrifice of the children. Operation was successful in this instance a living child was delivered and the patient had a smooth convalescent puerperium. Exception might be taken to the opinion expressed by the author that many major abdominal operations could be done quite as well at the patient's home as in the hospital. Certainly with the history of the case in hand transportation to the hospital could have been effected long before the time of the operation the need for which was evident. PETER F WILLIAMS.

Tweedy E. H. The Lower Uterine Segment Its Origin and Boundaries. Lan & Lond 96 505

It requires only a very minute portion of the upper portion of the cervix to suffice for the growth of the lower uterine segment. We must think of the cervix as growing large rapidly rather than of its being rapidly stretched. These changes in the growth of the cervix result from stimulation by direct pressure exercised by the ovum during the latter half of pregnancy and during labor. To understand the progress of the growth of the lower uterine segment it is important to keep in mind certain established anatomical and physiological features. The endoperitoneal tissue forms an important diaphragm for the pelvis. Its fibers are inserted into the muscle bundles of the uterus and may be considered the main structural elements of the

latter. The diaphragm is held in tension by the uterine muscle. It supports the uterus, prevents descent of the contents of the abdomen and constitutes a barrier which effectively protects the cervix from pressure. The os internum opens at an early period of pregnancy and this relation corresponds with Hegar's early sign of pregnancy. Consequent on this opening the uterus and abdominal contents sag downward and the fornices become somewhat shallow. The uterine muscle-fibers are put out of tension by the opening of the os, with consequent contraction and retraction of these fibers and the upward movement of the diaphragm with its attached blood-vessels and ureter. This upward movement produces a still wider opening of the diaphragm, permitting the growing ovum to pass through it and allowing the latter to exercise direct pressure on the structures immediately beneath. Bearing these facts in mind we must conclude that the cervix is not an elastic structure, but, on the other hand, that it has a power of extraordinarily rapid growth when stimulated by continuous pressure. The similarity in the growth of the cervix to that of the growth of the lower uterine segment is very apparent, and we have no difficulty in following its subsequent development into the part known as the lower uterine segment. The ring of Mueller must be considered the undilated portion of the cervix which has as yet not been subjected to direct pressure and Bandl's retraction ring must consist of the structures which go to form the internal os. C. D. HAYES.

LYNN, F. C. The Systolic Blood Pressure in Pregnancy; Observations on Five Thousand Consecutive Cases in the Pregnancy Clinic of the Boston Lying In Hospital. *J. Am. M. Ass.* 1916, 196, 935.

In 80 per cent of pregnant women, the blood-pressure ranges from 100 to 130.

In 9 per cent, the blood-pressure may be below 100 one or more times. A blood-pressure below 90 does not mean that the patient will have shock unaccompanied by hemorrhage at confinement.

In 11 per cent of cases, the blood-pressure may be above 130 one or more times. Age, nationality and parity seem to have some influence on blood pressure. High blood-pressure in the young is more frequently a sign of toxemia than in those over 30.

Elevated blood-pressure is more commonly an index of toxemia than is albuminuria, and it is apt to be an earlier sign. The degree of elevation points more surely to the likelihood of toxemia than does the degree of albuminuria. Both, however, are of the utmost importance.

Isolated cases of elevated blood-pressure unaccompanied by albuminuria or evidences of toxemia occurred not infrequently. Usually they responded to free catharsis. Some pressures remained elevated in spite of treatment and apparently were normal during pregnancy at least for the patients who exhibited them.

A progressively rising blood-pressure, often from a low level, even though it never reaches the arbitrary danger point, should be regarded with apprehension as a most valuable sign of approaching toxemia. Toxemia is much more common with a blood-pressure above 130 than it is below that point.

Most cases of eclampsia occurred with pressure of 60 or more. Eclampsia may however occur with a moderately elevated blood-pressure.

All toxemias developed both albuminuria and elevated blood-pressure.

While the incidence of eclampsia in this series is about the same as the figures usually given, it is significant that two-thirds of the patients who developed convulsions absolutely neglected advice and refused to return to the clinic. Had these patients been discharged against advice during pregnancy for disobeying instructions, very favorable statistics would have been obtained. The hospital feels that it would have been most unjust to the ignorant foreigners, who constitute the vast majority of its patients, to desert them when they most needed skilled hospital care. With proper co-operation from the patients and eliminating the fulminating cases which develop in a few hours, there is no doubt that eclampsia would be practically preventable disease. EDWARD L. C. WELLS.

LABOR AND ITS COMPLICATIONS

WICHMANN, S. E. The High Forceps Operation (Zur Klinik der hohen Zangoperation). *Arch. und Arb. Stockholm*, 9, 6. *Kirurgi N. p.* and No. 2, p. 3.

The author in a very detailed and comprehensive article deals with the clinical data obtained in 900 high forceps operations in the obstetrical clinic of the University of Helsingfors from the beginning of the year 800 to the middle of 94. A short summary of each case is given. The matter is so diffuse and extensive that only an outline of the points discussed by the author can be presented in an abstract.

Under the heading of material Wichmann discusses choice of the cases, distribution of the material according to differences of maternal pelvis, size of the children, the manner of presentation of head in pelvis, indications calling for high forceps operation, age of the mothers and number of labors.

Under prognosis of high forceps operation, the following points are considered:

1. For the mother: (1) mortality, (2) injuries, (3) post partum hemorrhages, (4) morbidity, (5) late results.

2. For the child: (1) mortality, (2) as regards the pelvis and weight of child, (3) age of mother and number of previous births, (4) indication for operation, (5) mobility or fixation of head, (6) causes of death of the children, (7) injuries, late results.

The technique of the high forceps operation by various operators is discussed. Finally the value of the high forceps operation as regards position of the operation in the therapy of the contracted pelvis.

and significance of the resistance of soft parts as regards prognosis for mothers and children in high forceps operations. The article is accompanied by an extensive bibliography. W. A. BRENNAN

Mundell J. J. Pituitrin in Labor. *Am J Obstet* N. Y. 9 6 lxxiii 304

The author has reviewed the rather extensive literature which has accumulated on this subject during the six years this extract has been used in obstetrics. He has collected reports of 3,952 cases in which it has been used and gives a table showing the unfavorable results which have been reported by various writers. There were deaths due to rupture of the uterus, but in each case the records show that these fatal cases were due to the misuse of pituitrin. He finds a fetal mortality of 21 in 3,952 cases and a maternal mortality of 1.

This study shows the need of careful analysis of all the factors in the case before reporting the good or bad effects of such a powerful extract as pituitrin. C. H. DAVIS

Skell A. J. Analgesia and Anesthesia in Obstetric Practice. *J Am M A* 19 1 lxix 9

In labors not distinctly abnormal morphine is used during the first stage and only when the labor is expected to last at least four hours longer. The author's indications for morphine during the first stage are:

1. A rigid hypersensitive os.
2. Evidence of considerable pain with a probable first stage of several hours, as in most primiparae.
3. The presence of nagging but ineffectual pains which irritate and exhaust the patient out of proportion to results.

Accordingly many patients particularly primiparae get a single hypodermic of one sixth grain of morphine.

At the beginning of the second stage or if the patient suffers severely shortly before dilatation is completed the use of gas is begun. Intermittent administration is made at first that is during the pain only and with small amounts as 30 gallons of nitrous oxide to 15 gallons of oxygen. As the head approaches the pelvic floor and finally strikes the perineum the nitrous oxide is gradually increased in volume to 50 or 60 gallons and the intervals between administrations are shortened. This gradual increase of the volume of the gas given is controlled by the patient's statement of pain or comfort during uterine contraction. As the perineum begins distending and the most painful stage of labor arrives the gas is given still more continuously until, at the time of crowning from 70 to 80 gallons of nitrous oxide are given practically continuously. When the head is born the nitrous oxide is at once discontinued and the patient sharply revived by a few inhalations of pure oxygen.

If the woman is a primipara with a rigid inelastic perineum and lacerations seem inevitable the utmost possible relaxation is secured by switching to ether

and pushing to complete unconsciousness at the moment the head crowns the perineum.

The author enters a vigorous protest against the advice at present being so freely given that anyone may use gas in labor cases with perfect safety. Gas is a powerful therapeutic agent with infinite possibilities for harm at the hands of incompetent or careless users. The statement has been made that gas in the hands of an expert is a safe anesthetic but the most dangerous anesthetic if given by a novice. This is far too strong a statement to make concerning analgesia. Even here however some knowledge and experience are necessary to secure both safety and satisfaction from its use. Moreover the temptation to follow a gas analgesia labor with a gas anesthesia for repair is so obvious that all those who expect to adopt this method should spend sufficient time in special study of the agents they are to use so that they can direct its administration. This does not mean that a doctor must equip himself as a gas expert. The skill necessary for its use in labor can be acquired in a short time but free use of gas by the absolutely inexperienced will surely lead to tragedies. EDWARD I. CORNELI

MISCELLANEOUS

Francis, L. M. Treatment of Ophthalmia Neonatorum. *B Jale M J* 19 6 lxxv 344

The author not only discusses the treatment of ophthalmia neonatorum but also those features in its management which are of interest to the general practitioner. The article may be summed up as follows:

1. Not all ophthalmias of the newborn are gonorrhoeal. 30 per cent are due to other organisms as the staphylococcus streptococcus etc.

2. There are two classes of ophthalmias: those primary infections occurring at the time of birth and those where the infection occurs secondarily from extravaginal sources.

3. Early diagnosis is imperative. All new cases of ophthalmia must be regarded with suspicion until proven to be of a benign nature. Smears should be made early.

4. In unilateral infection the other eye should be protected and the attendants warned of the danger.

5. Because of the frequent serious corneal involvement gonorrhoeal ophthalmia should be under the care of the ophthalmologist.

6. Careful and intelligent nursing is as important as medical advice in these cases. C. D. HOLMES

Barnett C. J. Treatment of Gonorrhoeal Ophthalmia. *M J Med Rec* 19 6 lxxvii 239.

The author has used cresatin in a number of cases of gonorrhoeal ophthalmia and finds it an excellent drug. Cresatin is a phenol derivative of very powerful germicidal properties, entirely free from the corrosive destructive action of the ordinary phenols.

The duration of gonorrhoeal ophthalmia under

this method of treatment is twenty four to forty eight hours after the first application. In most cases one application was found sufficient. In one case more than two such treatments given. Gonococci were rarely found after the first application where they did so appear a second application effectively disposed of them.

The technique is as follows. A 25 per cent solution of cresatin in alcohol is used. The conjunctival sac must first be cleared of secretion by means of a stream of warm physiological saline or saturated boric acid solution preferably through an undrained. This is followed by the instillation of a drop or two of a one per cent solution of boric acid or cocaine to prevent the slight irritation of the next step. A small cotton swab used to apply drop of cresatin to the mucosa of the conjunctival sac. It is imperative to cover the entire surface of the conjunctiva in this application. The after-treatment consists in keeping the conjunctival sac free from pus and the repetition of the application should occur as demanded. RALPH H. KIMM

Hannah, C. R. J. J. ries the Infant Prodced Birth. *T. St J Med* 9 6 21 539

The author discusses the various causes for birth injuries, and gives the histories of four cases of long and difficult labor followed by injuries to the infants.

It is in cases of contracted pelvis that the infants suffer most. Here the use of the forceps produces a depressed fracture, concussion of the brain or an intracranial hemorrhage, any one of which may cause permanent pathological change which in later life may explain paralysis, headache, epilepsy and other existing maladies. Usually these injuries are the result of the scientific application of the mechanics of delivery. Brute force is substituted for proper and thoughtful manipulations. Prolonged and hard labor pains, which prevent a change in the fetal blood, are frequently found in cases of generally contracted pelvis, and in cases with rigid and unyielding perineum.

In conclusion the author emphasizes the following points:

That neglect of frequent observance of the fetal heart-sounds cost the life of many child.

That a slow irregular fetal heart beat or excessively fast one signifies fetal danger.

That the presence of mephitic or sea-green meconium in the liquor amnii in cephalic presentation may mean compression and failure to recognize this fact hazards the life of the fetus.

That placental may cause tetanic contractions of the uterus, and if so an interference in the placental blood may be prevented which would produce hypercalcemia.

That an irregular and slow fetal heart or an excessively fast one or the presence of meconium in the liquor amnii are symptoms which indicate that the fetus must be delivered or it will probably die.

That if an attempt to deliver is made it should first be made certain that the child can be delivered alive. That it will probably live and second that the mother will not be injured.

That an internal hernial mass using internal pressure should be removed early or pathological destruction of the nervous system will take place which may use deformities, imbecility, epilepsy and other forms of degeneracy. RALPH H. KIMM

Davis, L. P. Syphilis in Its Relation to Obstetrics. *J. Am Gynec Soc* Wash DC 9 6 51 3

Davis believes that the most positive diagnosis of syphilis in the parturient may be derived from the fact that it is recognized by examining the parasites found in the blood of the umbilical vein and the oncotri of the umbilical cord. This gives an opportunity for examination suspected cases without poisoning mother or child or causing interference with the parasites are never found in the mother but occasionally the chorion. When found the placenta they are the rule and in the blood of these cases. Should the retention of the placenta be careful they will probably be destroyed by the blood of the mother.

Syphilis may be diagnosed in the placenta when gummatous placental lesions or marked or growth of the placenta of the placenta is present. Similarly the comparison of the placenta of the child is as a whole in syphilis the proportion is 4 to 1 at the marked increase in size of the placental placenta. Where the mother is syphilitic although the child is not yet approached as found in the mother or to per cent of cases. In her both parent syphilis the placenta shows some of their presence in per cent. Syphilis is transmitted from mother to mother through the leucocytes of the umbilical vein or through the red cells of the blood. So far as fetal effect by syphilis concerned the placental lesion is much less important than as previously supposed.

The syphilitic are found abundantly in the organs of the syphilitic fetus and represent three fifths of all macerated fetuses.

Where the syphilitic can be found in the blood of either parent or in tissues removed from lesions, the diagnosis is positive. Searching for the parasites, the fetus must be kept in mind that bichloride of mercury 5,000 causes the parasites disappear from tissues, and hence one must be taken into antiseptic precautions destroy the possibility of diagnosis.

Syphilis may form antigen in the milk, which protect against infection. The mother is then especially well prepared to receive offspring which may be and probably is, syphilitic. Should the child be syphilitic and the mother about to nurse.

Syphilitic nurse should be secured for the child but if the mother be syphilitic and the child healthy, the child should be artificially fed. In doubtful cases, it is best to procure a healthy wet nurse.

The majority of writers today believe that Colles' law is no longer valid in view of our present knowledge. The condition known as latent syphilis in the mother, the antigens which her breast milk contains and the belief that the fetus conveys syphilis to the mother are proof against the validity of Colles' law.

Treatment may destroy spirochætae but unfortunately toxins produced by the parasites may still poison the patient.

The Wassermann reaction cannot be relied upon for a positive diagnosis of syphilis. Pregnant patients having diseases caused by protozoa or tuberculosis malignant growths scarlatina pneumonia and eclampsia may give a positive Wassermann reaction when syphilis is absent. It has frequently been observed that a patient having a negative Wassermann reaction is greatly benefited by antisyphilitic treatment.

Noguchi's vaccine known as lumen is useful in preventing the development of tertiary syphilis. It has not been especially successful with pregnant women.

The frequency of syphilis among parturient women is difficult to estimate. Fournier found that among married women in his clinic 70 per cent had syphilis before marriage and 20 per cent afterward. In the majority the first sign of the disease appears within six months after marriage. When history could be obtained it was found that the husband had become infected less than three years before marriage. The first three years after marriage is the most dangerous period of life for the woman so far as infection by syphilis is concerned. Both syphilitic men and women should receive continuous treatment for at least six years after marriage.

In parturient patients syphilis may cause lesion in the genital tract making post-neous birth difficult impossible. The mortality of syphilis of parturient women is estimated at 1 per cent largely from mixed infection. Fetal perinatal morbidity is much increased by syphilis and phenomena may be observed in the perinatal period.

It is commonly supposed that syphilis is a frequent cause of abortion but this is now being denied.

In the living newborn a diagnosis can be made by examining the umbilical cord and detecting characteristic parasites in the wall of the umbilical vein and connective tissue. In apparently healthy children spirochætae are often found at the umbilicus. The X-ray is especially valuable in this way in the newborn the steech reaction being an important symptom of the disease. Syphilis is a frequent cause of stillbirth and of stillborn infant in whom there may be no apparent sign of the disease. Children born with syphilis remain apparently healthy and develop disease at the joint the lymphatic the bones and the meninges as late as a year after birth. Birth defects are often attacked and the fetal character of the disease differentiates it from tuberculous disease at the knee joint which is unilateral. In these cases the venereal fluid may give a positive Wassermann test.

The percentage of syphilitic children is between 1 and 2 of the first year and a long incubation usually 1 to 2 years in 12 per cent.

As regards the frequency of syphilis in the newborn among the poor 1 child in 100 is an infant in whom syphilis is born among the poor in the United States 1 child in 3 per 1000 among the venereal gave a positive Wassermann reaction. Complications of the newborn are by many not considered a syphilitic but a streptococcal infection. The characteristic lesions are at the tip of the palms of the hand in the sole of the feet and in the peculiar staining of the tissues about the mouth and the anus.

Salvarsan treatment is useful for both mother and child in acute and chronic syphilis but it will not prevent the death of the child in stillbirth or toxemia. The majority of observers use salvarsan to a moderate and severe cases and rely upon mercury and iodine to complete a cure. In using salvarsan the urine should be repeatedly examined to observe the excretion of arsenic. Should this fall poisoning may result. Many prefer to treat the pregnant woman by hypodermic injection of a mercurial preparation.

GENITO-URINARY SURGERY

ADRENAL, KIDNEY AND URETER

Thomas, G. J. Clinical Review of 240 Cases of Non-surgical Infection of the Kidneys and Ureters. *Urol. & C. Gen. Res.* 9 6 XII, 17

The author analyzes 240 cases of renal infection which received urological treatment in the Mayo Clinic. Tuberculosis and infection secondary to calculus or urinary obstructions are excluded. Frequency of urination is the earliest and most frequent symptom, 76 per cent. Cystitis, however, was noted in only 6 per cent of the cases. Renal pain was the initial symptom in 37 per cent and hematuria in only 7 per cent although present at some time in 4 per cent. Ninety-five cases had bacteriologic examination and 63 per cent of these were colon infections. Thomas argues that the original offending organisms probably lessen the resistance of the kidney so that the colon bacillus which is constantly passing through the kidney becomes pathogenic. The majority of infections are bilateral and should be considered so until proven otherwise by pyelography and cultural examination. Contamination is frequent usually from poorly sterilized ureteral catheters or the use of an unsterile lubricant.

In treatment a careful search for foci of infection, such as tonsils, teeth, abscesses, furunculosis, bone infections, etc. should be made before urologic treatment is instituted. Of local treatment lavage of the kidney pelvis and ureters every four or five days was most frequently used. Lavage with 0.5 to 3 per cent silver nitrate. Of 150 cases which were followed in 50 per cent the condition remained stationary, improved in 46 per cent, and cured in 18 per cent. Of the 38 cases cured, 6 had autogenous vaccine only, 6 vaccine and urinary antiseptics only, 4 urinary antiseptics only, 2 pelvic lavage, and 2 vaccines and lavage whereas, 3 cases had urinary antiseptics, vaccines, and lavage. Three cases received no treatment, were operated upon and one had bladder lavage only. FRANK HIGMAN

Crabtree, E. G. A Method of Demonstrating Bacteria in Urine by Means of the Centrifuge; the Relative Value of Examinations by Culture or Stained Sediment. *Surg. Gynec. & Obst.* 916 XIII, 1

The author calls attention to certain unavoidable errors in the diagnosis of urinary infection where the clinician relies entirely upon cultural evidence. These errors are due to four factors:

1. The tendency of some common bacteria like the colon bacillus when recurring in mixed infections to overgrow other perhaps more significant bacteria.

This occurrence is most troublesome in infections with phosphate calculi and in sections of the kidney where a colon pyelitis already exists.

2. The tendency of chromogenic bacteria to obscure their more significant growths in culture.

3. The possibility of formalin treatment of small quantities of urine being washed off formalin sterilized catheter sufficient to inhibit growth in culture.

4. Routine culture fails to demonstrate the more rare bacterial infections because of suitable cultural conditions and media.

He calls attention to the value of staining as a control to cultural examinations of urines as a means of avoiding the above. By his method of eliminating pus from centrifuged sediment large numbers of bacterial tubercle bacilli when present are demonstrated. Sufficient evidence as to the nature of the organisms is obtained by stained over examinations to indicate proper cultural examinations as readily recognized infections by the number of bacteria.

Schmidt, L. E. The Role of Urine Stasis in Etiology of Pyogenic Kidney. *Lancet* 9 6 CIV, 9

Urine stasis is probably the most factor in establishing renal infection. It is recognized that if lowered resistance of present urine stasis may account for changes in the kidney and the sequelae. Bacterial invasion may take place by the ureters or their lymph-channels. Provided that an infectious focus exists in the or the immediate neighborhood. Recurrences have undoubtedly demonstrated the existence of a lymph-channel between the bladder by way of the ureter and thus out is the author the most important source of renal infection.

Owing to predisposing factors existing such as periods of congestion of their genital system superinduced by menstruation, pregnancy, labor the possibility of the establishment of infections of the kidney is greater than in the male. Schmidt believes that this type of infection though some statistics state the contrary is frequently met with in the female sex.

Owing to the close relation of the infection to the kidney by lymphatic circulation sections of the kidney are easily accounted for generally occur on the basis of intestinal

and stasis. In the etiology of urine stasis congenital renal anomalies of formation or location (horseshoe kidney, dysplasias with anomalous vessels favoring stone formation, polycystic kidney, etc.) play an important rôle. Schmidt has observed that many of these conditions are the nucleus for later occurring renal infections. In 11 cases of congenital polycystic kidney, which came to operation, 9 were complicated with infections. The same is true of hydronephrosis in the vast majority of which infection sooner or later necessitates operative interference.

Operative injuries of the ureter obstructive conditions connected with advanced renal neoplasms, parasitic growths of the kidney and concretions of the upper urinary tract are cited as other and frequent sources for renal stasis and consecutive renal infection. In looking over his operative records the author found that urine stasis in the pelvis of the kidney was an important factor in infections of the kidney, that in fully four fifths of his cases the colon bacillus could be demonstrated as the infecting agent and that but a small percentage of cases are ascending in character.

Owing to the fact that obstructive conditions of the urethra are more prevalent in males, consecutive infectious changes of the upper urinary tract are less frequent in women than in men, a fact that is borne out by the author's statistical compilation of his own material.

The reverse is true of urine stasis due to pathological conditions in the bony pelvis causing pressure on the ureters, which are by far more common in the female sex. The greater frequency of renal infections in the male as evidenced by the author's statistics on his own work is explained on the basis of the preponderance of more favorable conditions for general infections in that sex.

The author concludes his very instructive article by insisting upon early operative relief for the great majority of cases of renal infection as a sequel to urine stasis. A more expectant régime may yield good results in the frequent cases of colon infection consecutive to congestion while in renal infections due to the more common pus-producing organisms may a timely surgical measures are fraught with satisfactory results.

M. A. B. R. 1914.

Danziger, F. An Unusual Case of Kidney Ripping by a Grenade Splinter. *Arch. f. klin. u. exp. Med.* 1914, 11, 160.

Danziger gives a short clinical report of a very interesting and unusual case of ripping of a kidney by a splinter from a grenade. On operation the kidney was found to be completely torn in two pieces, the ureter which was also torn from the bladder being attached to the smaller piece. The renal cavity was cleaned out and tamponed, the ureter removed and the vessels in the vicinity ligated. The peritoneum was not injured. After a temporary tampon with drawn and the clot of the torn

kidney united and sutured. The hemorrhage was slight and there were no complications. Recovery was uneventful.

W. A. B. R. 1914.

Stutzin and Gundelfinger. War Injuries of the Urogenital System. *Chirurg. u. gynec. Wochenschr.* 1914, 39, 22.

Stutzin, who writes from the German Red Cross Hospital at Constantinople, discusses the most frequent type of injuries of the genito-urinary system occurring in war. He gives the details of the clinical history in ten cases of this kind observed by him. He points out the difficulty of carrying out the complicated diagnostic and operative technique required in such cases at the front, but says that cystoscopy is possible and necessary in the field.

Injuries of the bladder are the most frequent type observed. Where the healing is tardy, incision and drainage must be resorted to.

In the case of ureteral fistulae occurring from wounds without spontaneous healing, nephrectomy is called for. Sectioning of the bladder is generally the rule in the case of urethral injuries. Plastic operations are often required on the genital organs and, when necessary, the scrotal skin is best utilized. The after-treatment of all cases operated upon for urogenital injuries must be carefully watched.

W. A. B. R. 1914.

Kakels, M. S. Large Congenital Hydronephrosis in an Infant Six Weeks of Age. *Arch. f. klin. u. exp. Med.* 1914, 11, 527.

Kakels reports this case on account of its rarity, the youth of the patient, the large size of the hydronephrosis, its rapid progress, and its successful removal by transperitoneal nephrectomy.

The infant was six weeks old, ventricose from birth, and since birth a gradual and increasing swelling of the abdomen had been noted. On examination the whole abdomen was found to be greatly distended with the swelling bulging from under the costal borders on both sides and to the right flank, an elongated mass was felt with fluctuation. The diagnosis lay between a malignant and non-malignant growth of the kidney and, as corroborated by the X-ray plate, such that it was a retroperitoneal growth.

On account of its large size, the growth was extirpated transperitoneally through the anterior abdominal route and 300 cc. of straw-colored, urinitic fluid was removed. The sac showed that it was continuous with a greatly enlarged kidney three times its normal size, made up entirely of distended pelvises of globular form and not pear-shaped. There was neither structure nor dilatation of the ureter but from its bluish, faint and at an anomalous position the author ascribed these factors the biological element in the causation of the hydronephrosis.

L. C. R. 1914.

Ramsdoff, J.: Unilateral Haematuria Surg. Gynec. & Obst., 9 6 xiii, 75.

Ramsdoff presents a case of pancreatic cyst, with what he believes to be the unique symptom of haematuria. The tumor was in the left upper quadrant projecting into the loin, distinctly fluctuating and of slow growth. When first seen it was nearly as large as an adult head. Cystoscopic examination showed a bloody stream of urine issuing from the left ureteral orifice. Indigocarmine injection demonstrated equal function on the part of the two kidneys.

Ureteral catheterization and radiographing of the renal pelvis was refrained from on account of the weakened condition of the patient at the time of examination. The barium injection of the rectum showed the colon normal.

Exploration of the left kidney by lumbar incision revealed a somewhat larger kidney than normal. A diagnosis was made of cystic sarcoma of the left kidney. Lumbar exposure of the kidney showed it to be normal. Median incision then displayed the cyst of the pancreas, projecting between the colon and the stomach, with the spleen six or eight times its normal size. The pressure of the pancreatic cyst on the renal and splenic vein had produced the haematuria and the enlargement of the spleen. The haematuria disappeared after the operation.

So far as the author knows, the case is unique, since a search of the relevant literature has failed to show another case.

The pancreatic matter of the cysts was demonstrated by the presence of the three pancreatic ferments: alkaline phosphatase, amylase, and lipase. There were also present little masses of asphoned fat.

Macedo, C.: The Periods of Amelioration in Renal Tuberculosis (Los periodos de mejora en la tuberculosis renal) *Cris. med. Lima* 9 6, xiii, 33.

From clinical histories the author deduces that during the long periods of arrest or apparent cure of renal tuberculosis, some symptoms improve and even disappear while others persist, revealing the existence of the primitive pathologic state of the kidney.

The symptoms diminishing in intensity or disappearing are: (1) lumbar pain, (2) frequency of micturition, and (3) haematuria.

The clinical signs which persist are: (1) polyuria, (2) albuminuria, (3) pyuria, and (4) bacillus tuberculosis.

Cystoscopic examinations have proved to the author that—(1) acute cystitis of a tubercular origin may develop into a chronic state, with a normal functioning of the urinary bladder, (2) cicatrices of advanced tubercular lesions may be observed, (3) in such conditions characteristic cystoscopic aspects are met with.

Renal tuberculosis starts insidiously and develops without being discovered by the patient or the

attending physician, then it confines itself to lesions of the renal parenchyma, latent tuberculosis.

When the patient has reached the stage of acute tuberculosis, producing symptoms alarming to the patient and permitting of a diagnosis, the tuberculous process is sufficiently advanced to force the abandoning of all hope for a spontaneous cure or medical treatment; the end-result is the destruction of the kidney. Although renal tuberculosis and long living are incompatible, the only salvation of life in such cases rests with the surgeon, nephrectomy being the only treatment available with the understanding that all depends on the condition of the other kidney and the general condition of the patient. RIVER L. VIO.

Simmonds, M.: Danger of Pyelography (Ueber die Gefahr der Pyelographie) *Menschen med. IV. Ausdr.* 9 6 xiii, 79.

In a case in which Simmonds made a pyelographic investigation on so doubtful kidney symptoms, the patient died on the third day following. In this case 5 cm of 5 per cent Iargol solution were injected into the right kidney pelvis. He died with some other reported cases of death following collargol solution injections.

From the autopsy made in his case it is clear that Simmonds had collargol poisoning, not the cause of death but that death resulted from a streptococcus septic infection. There were apparent pyemias in the rete by which the streptococci had found a mode of entrance into the blood stream. While it is not clear what part the injection may have played in the passage of the microbes, yet a 5 per cent solution was evidently not bactericidal.

Among the dangers of pyelography therefore must be reckoned on that is usually ignored, i.e., septic infection. The surgeon must take special precautions to avoid injuries to the kidney tissues by the infusion, and if the bladder, lower urinary passages are found to contain infective microbes it is better to abstain from pyelography.

W. A. BRENNAN

Grossi, V.: Clinical Considerations of Ambard's Constant (*Applicazioni cliniche della costante di Ambard*) *Ped. Roma* 9 6 xiii, sec. III, 4.

Grossi has made an extensive study of the clinical result obtained by himself and others in the application of Ambard's constant. His own experience is based on 51 complete clinical cases in which the constant was observed 77 times. He concludes that Ambard's urosecretory constant is like various other methods of value in examining the renal function, indicating the global alteration of the function of the kidney and that it can in its extreme limits confirm a lethal prognosis or cause more caution in making an operative intervention. It is superior to the calorimetric method in cases where catheterization of the ureters is impossible.

In regard to the numerical limitations imposed by

Chevaasu, Grossi believes that they have no absolute value and that the interpretation of the constant ought to be made in each individual case according to the clinical criteria and the various causative factors: azotemia, ureic concentration, daily ureic elimination.

In 5 patients dying from renal insufficiency the azotemia was always higher than 1 gram in one case it reached 5.2 gr per 1000 in one case for some few days before death it fell to 0.3 gr. Three cases in which the azotemia was above 1 gr were operated upon successfully and recovered 1 died four months later.

The ureic concentration in cases of death was always below 10 per 1000. The daily elimination was still less and was associated with oliguria. In 2 patients dying from hematogenous infection of the kidney the constant and its factors were almost normal.

From the surgical point of view great value should be attached to the ureic concentration and to the daily elimination which correspond in reality to Albarran's two-hour examination of the global urine and to Cathelin's analogous procedures.

The significance and pathogenesis of the azotemia and of the constant are very far from being clear. In their present state Grossi thinks that we must consider them as simply signs to which it is necessary to attach great importance perhaps just as much as to the albumin contents of the urine.

W. A. BAEY

Wechselmann: Intravenous Injections of Lactose Without Reaction: Sclayer's Kidney Test (Ueber reaktionslos verlaufende intravenöse Milchsückerinjektionen). *Beri kl. Wochenschr.* 916 III, 84.

Wechselmann has been using the lactose test for some years past and in many thousands of cases. His experience is that it is very reliable when the lactose is pure and furnishes a dependable index of the kidney functioning. The ill effects which some have found after the use of lactose are explainable as due to the presence of impurities.

W. A. BAEY

Wyman M H: The Phenolsulphonephthalein Estimation of Renal Function in a Thousand Cases. *J. So. C. M. A.* 96 VII 84.

The majority of the 1,000 tests were done on surgical patients at the Columbia (S. C.) Hospital as a part of the routine examination.

An output of 50 per cent or over comes only from normal kidneys.

A 60 per cent output may be temporarily observed in cases where there are at the same time evidences of kidney disease: albumin or casts but if the latter do not clear up quickly the output soon begins to decrease.

When a sound kidney is compensating unusually well for its diseased fellow we may find a 60 per cent excretion together with albumin and pus.

But in 25 per cent of cases evidence of kidney disease is accompanied by an excretion below 60 per cent.

From the prognostic viewpoint the important thing is whether the curve rises or falls. A man may be regarded as a good surgical risk with an output of but 20 per cent provided the curve has risen and is stationary. I. I. CARD

Hunner G L: Ureteral Stricture Excluding Cases Due to Tuberculosis and Calculus. Report of Fifty Cases. *J. Am. Med. A.* St. Louis 96 April.

In discussing stricture of the ureter the author is dealing only with the narrowing of the ureteral lumen due to intrinsic disease of the ureter.

The report of cases is further limited by excluding strictures due to tuberculous disease and those strictures immediately surrounding a stone.

Thus limited inflammatory stricture is a far more common disease than is generally believed the author's cases up to November 1915 numbering 50 as contrasted with 49 nephrectomies for tuberculosis and 30 operations for stone in the ureter.

The author recognizes congenital narrowing as an etiological factor in the disease but thinks its importance has been greatly overestimated and does not classify any of his cases as due to this cause.

Other causes are gonorrheal infection probably traveling up the lymphatics from the bladder and pyelonephritic infections which others have considered as infecting the ureter by way of the urine stream. The author thinks it more probable that the ureteral wall involvement is synchronous with the pyelonephritic infection and like it has a blood or lymph stream origin.

Ureteral stricture from the ordinary pyogenic cystic infections is extremely rare. Traumatic cases follow operations childbearing and other sources of injury to the ureteral wall.

The author thinks that by far the greatest source of ureteral stricture is some distant focus of disease such as infected tonsils sinuses teeth or disease of the gastro-intestinal tract.

In such cases the disease settles in the ureteral walls and causes the narrowing which in many cases is followed by dilatation and later by infection of the urinary tract.

The symptoms of ureteral stricture are for the most part due to the obstruction and are identical with the symptoms of stone in the ureter. Some patients complain only of a more or less constant dull aching pain in the lumbar region. Others have this constant dull pain with acute exacerbations of pain in the kidney region and the pain is often reflected down the ureter. There may be bladder and rectal tenesmus. Such attacks may require morphia, and either the pain or the morphia may bring about severe nausea and vomiting.

If infection be present the above symptom are likely to be more severe and are accompanied by chills high temperature and profound prostration.

The congestions incident to exposure getting the feet wet, catching cold, and those due to the menstrual period are likely to cause partial or complete temporary closure of the inflammatory area and thus bring about a severe attack of renal pain. Spontaneous local pain at the stricture site is complained of in some cases.

The diagnosis is made on the history, the urine examination, and the physical findings. As above stated the history is that of tone in the ureter or of pyelitis. The urine may be quite negative but it usually contains a few red blood corpuscles or a few leucocytes and it may contain both in small or large numbers. Particularly after severe renal colic, the urine may be smoky with blood or if infection be present it may be turbid with pus and bacteria.

The observation that the urine may be quite negative in these cases is a most important one from the diagnostic standpoint. Too often with a negative X-ray and with normal urine it is concluded that the urinary tract is not involved and renal catheterization and the obtaining of a pyelo-ureterogram are neglected. The patient is operated upon for appendicitis, or some form of exploratory laparotomy is done and the victim continues to suffer or to find partial relief in expectant methods of treatment.

If the stricture be located in or near the bladder wall, it may be palpated as a definite thickening indistinguishable from the dilatation usually surrounding a stone, and cystoscopy in such case often shows redness and edema about the ureteral orifice.

If with the above history and urinary and physical findings one is unable by X-ray and a wax-tipped catheter to locate stone in the ureter, probable diagnosis of stricture is justified.

Repeated obstruction to the renal catheter at a certain distance from the bladder is further evidence of stricture.

By melting pure beeswax and making a wax spindle on the renal catheter, the short distance back of its tip one can appreciate the obstruction to this spindle as it meets the stricture and a more certain diagnostic feature is the hang of this spindle on the stricture area as the catheter is withdrawn.

Additional corroborative evidence of stricture is the presence of hydronephrosis although a measurable increase in kidney and ureter content may be absent even after years of recurrent renal attacks.

The trauma of catheterization is often followed by a severe renal attack and in the infected cases by a typical pyelitis attack. In suspected ureteral stone or stricture a large catheter or preferably a large catheter with wax bulb dilator should be passed to dilate sufficiently to avoid this edematous closure of the lumen after examination.

The author has seen several cases in which the fluid content of the kidney pelvis was less than

normal. These are usually cases with a prolonged infection which has resulted in contraction of kidney pelvis in spite of the mechanical obstruction lower down causing symptoms. A pyelo-ureterogram in such cases shows the site of the ureter stricture and a slightly dilated ureter above the point.

The author takes definite issue with the prevalent opinion that dilatation of the kidney pelvis and ureter are due to infection. Many of his cases with sterile urine and no history of previous infection have the dilated ureter and pelvis.

Of 44 cases with urine report, 16 were sterile of these 6 have notes on the kidney content of these were approximately normal, measuring respectively 8 and 12 ccm. 7 had a hydronephrosis ranging from 15 to 30 ccm. and one excepted with clear urine measured 385 ccm.

Of 18 infected cases, 5 were measured 4 being normal or less than normal size and the pelvis 11 cases averaging 130 ccm. In this series of cases the average duration of symptoms in the six cases was two and a half years, and in the infected cases four years.

The ideal treatment for stricture of the ureter is dilatation from the vesical approach. Dilatation results in relieving the patient's symptoms and shrinkage of the distended pelvis and ureter. Infection be present dilatation is supplemented by renal lavage although it is probable that in many cases would clear up without the lavage simply giving the urine free drainage. In the infrequent cases of long duration with immense sacculated kidneys one may be unable to clear up the infection but after dilatation of the stricture the kidney pelvis shrinks markedly the urine becomes more clear and in some cases entirely clear even for the bacteria and microscopic pus, and the patient is restored to approximately normal health. These facts are of vital importance to those path with bilateral stricture. In the cases with one lateral stricture and with immense hydronephrotic pyonephrotic kidney conservatism often calls for the extirpation of the kidney. This was done six times in the author's cases.

In cases that cannot be dilated by the vesical approach the author advises extraperitoneal exposure of the ureter and retrograde dilatation. This was done on 8 of his 50 cases, with excellent results in 6. Two of his early cases failed to obtain complete relief probably because of insufficient dilatation.

Bilateral stricture was demonstrated in 12 of 50 cases. It is probable that systematic examination would have shown a larger percentage of bilateral cases, as some of these 12 had symptoms on one side only and the other side was accidentally found to have stricture in the course of a check test or after relief of symptoms on one side the patient returned later with symptoms in the other kidney and these were found due to stricture the corresponding ureter.

BLADDER, URETHRA AND PENIS

Woodall G W. Some Problems in the X Ray
Diagnosis of Urinary Calculi. *11th Y M J*
9 6 1961 17

According to Woodall the X ray is but one of three indispensable means of diagnosis in cases of suspected urinary calculi. The other two are (1) a careful history and physical examination (2) a cystoscopic exploration and study of the urinary findings from the bladder and kidney.

He groups the cases from a roentgenologic viewpoint into three classes:

1. The X ray findings may be positive and easily confirmed by cystoscopic and other data.
2. The X ray findings may be negative and very misleading unless subordinated to other available positive data. Negative cases may suddenly become positive due probably to some change in the composition of the calculi.

3. Apparently positive X ray findings may prove to be erroneous when checked by cystoscopy and other means of diagnosis.

Several case histories are given to illustrate each group.

Woodall considers the X ray to be the most valuable single factor in the diagnosis of urinary calculi and to be of indispensable service when used in conjunction with a carefully taken history and an exhaustive study of the clinical aspects of the case. Used alone however without proper confirmation by such means as mentioned it may lead to serious error almost as often as it would furnish a correct diagnosis.

DAVID K. B. W.

Kelly H A., and Neill W.: Cauterization and
Fulguration of Bladder Tumors. *J. Am. A. S.*
1 19 61 72

The author reports two cases in which cauterization and fulguration were done for bladder tumors.

The first case a female aged 41 had been twice operated upon for papilloma of the bladder five and four years previous, respectively. Two years previous cystoscopy had revealed an ulceration 26 mm in diameter on the posterior wall. There was a similar area on the vertex 18 mm in diameter. Repeated fulgurations covering a period of eighteen months cleared up numerous tumor masses. At present the bladder is normal except for two small recurrent areas about 4 and 2 mm in diameter about the right ureteral orifice.

In the second case a female aged 38 the cystoscopy revealed a large papilloma attached to and filling the anterior surface of the bladder. Cystoscopy showed a growth 1.5 cm in diameter attached to the posterior wall and three large cauliflower growths on the anterior wall protruding into the urethra and including the left ureteral orifice. Nine tumors in all were removed. There was a recurrence two years later the size of a cherry near the left ureteral orifice but after fulguration there was no recurrence.

The author advocates the use of the Kelly's advantage being that it facilitates seeing and treating the pedicle at the tumor thereby shortening the period of treatment. There are two slightly diverging needles for fulguration. With the open type the curved little handle platinum knife is used. It is hooked around the pedicle and when heat is brought to bear through the pedicle.

Freund H. Experience with Mikka Operation
for Ectopia of the Bladder. *Urology*
1961 18 104

In a very comprehensive paper the author reviews a number of original operations for ectopia of the bladder and their merits and demerits. The author states that the Mikka operation is the most reliable and has the advantage of these procedures in that it is essentially an open operation and is not under the handling group of the ectopia. In the Mikka operation the bladder is brought into the normal position and the pedicle is removed. In the Mikka operation the peritoneum is not torn and the bladder is not damaged. In the Mikka operation the bladder is not damaged. In the Mikka operation the bladder is not damaged.

The technique of the Mikka operation is described especially the Mikka operation. The operation consists essentially in utilizing the cecum as a bladder and the appendix as a ureter. The modifications which have been suggested to avoid an ascending infection are referred to. The Mikka method including the author's case.

The only serious obstacles which might prevent the Mikka operation from being carried out are (1) the fact that the appendix may have been removed previously or (2) in cases where the appendix as the result of inflammatory processes may have become so altered as to be valueless. Furthermore (3) the cecum may be fixed normally or by inflammatory adhesions. Freund describes some means of obviating these complications. Against the disadvantages there are numerous decided advantages.

In summarizing his experience Freund concludes: (1) Age should be considered one should not operate on a child under five without serious reason. (2) A period of from six to eight weeks should elapse between the two steps of the operation (1) the preparation of the cecum and appendix and (2) the removal of the exstrophied bladder. (3) Ureteral catheterization and analysis of the specimens prior to operation is important. (4) If pyelonephritis of both sides already exists, operation is not advised. Although in several cases the operation has been a failure yet Freund is of the opinion that this is due to the fact that it was not carried out properly.

operator, but that in these cases there were two or three different operators. He further thinks that the results obtained in the cured cases are such as to lead to the belief that the Makkas operation is the operation of choice in bladder ectopia.

W. A. BRENZ

MacKenzie, D. W.: Double Urethra with Operation: Review of Literature. *Surg. Gynec. & Obst.* 9 6, xiv, 344.

The case reported from the genito-urinary service of the Bellevue Hospital was that of a young man 6 years of age who was admitted to the service in November 1904.

The patient had been troubled with enuresis nocturna at times since a child had always passed urine from two openings, one in the normal position on the glans penis and one in the frenum. About 1903 a small lump appeared on the center of the ventral surface of the penis. It was cut down upon and a stone one-half inch in diameter removed from the urethra. The sinus still remained. About six months later a perineal section was performed. This opening also refused to close.

Physical examination showed a well-developed healthy young man 5 feet 10 inches in height weighing 150 pounds. Urinary meatus normal in size and position. Sinuses, three in number: one at the frenum, one about 1.5 inches from the frenum on the ventral surface of the penis, and one in the perineum.

Rectal examination showed no abnormalities. X-ray of the urinary tract was negative for stone. Cystoscopic examination revealed a normal bladder with a small sacule into which the right ureter opened. The phenolsulphophthalein output was normal.

Exploration with probes and sounds revealed the existence of a urethra apparently normal except for a slight stricture in the bulb admitting a 6 F. sound. Of the three fistulae the posterior perineal one opened into the membranous urethra just behind the stricture. The other two, the frenum and near the scrotum, opened into a common passage which readily took a 16 F. sound and entered the urethra in the bulb just in front of the stricture.

The perineal sinus was excised and its opening to the membranous urethra closed. The subperineal canal was slit from the frenum to the bulb. It was found to be lined with normal mucous membrane and surrounded with its companion urethra by a common corpus spongiosum. It was extirpated completely from the bulb forward. The wound healed by primary intention, and the patient left the hospital passing all his urine through the normal passage.

The male urethra originates from two genetically distinct portions of the embryo, the prostatic and membranous portions resulting from therogenital sinus, while the remaining portion originates at a later period from the folds of the genital ridge or tubercle.

There are two important points to be settled according to Lebrun (1): Is the abnormal canal a urethra or merely some diverticular or canalicular excretory formation? (2) Granted it is a true urethra, how is its formation to be explained?

MacKenzie's conclusions after studying a large number of cases are briefly as follows:

The occurrence of more or less complete duplication of the male urethra, involving the canal from the bulb to the meatus, cannot be doubted, as a large number of well-authenticated instances of several degrees of the anomaly have been recorded. Accessory canals have been described as being about equal in size to the normal urethra and freely communicating with it in the bulb as in Meisels and the author's case. In other cases one passage was smaller than the fellow with which it connected in the bulb-de-sac. Perfectly authentic cases of accessory urethras extending to the bladder have also been reported.

The pathogenesis of the urethral duplication meets with difficulties. A number of explanations have been suggested, the most probable theory referring to the formation of double urethra to anomalies of the epibulbar urethral tract in the embryo.

GENITAL ORGANS

Smith, E. O.: Anatomy and Pathology of Seminal Vesicles. *U. S. Nat. Case Rep.* 91/70.

The author's report is based on a study of large amount of post-mortem material and out many points of practical value to the genito-urinary surgeon.

In his series Smith found the greatest variation in size and position of the vesicles and that that a great difference from the midline varies in different individuals and in the same individual according to the degree of distention of the bladder. Most of the vesicles, their upper pole overlap the ureter when it enters the bladder; it thus follows that bronchitis inflammation of the vesicles at this point may constitute the ureter, make ureteral catheterization difficult or impossible and by back pressure lower the resistance of the kidney to infection.

The main blood supply of the vesicle enters at the upper and lower poles, consequently careful ligation should be done at these points in removing the vesicle. The peritoneum occasionally was found to extend well down onto the vesicle and the dissection of the peritoneum at this point should be borne in mind in operating in this vicinity.

From the clinical standpoint the most important feature of the vesicle examined by Smith was the presence of multiple sharp angulations in the tubule offering very poor natural drainage. Thus shows that massage of the vesicles to be effective should void trauma and that satisfactory surgical drainage can only be secured by multiple incisions. In seeking for source of focal infections the vesicle should never be overlooked.

Calculi were not found in any of the vesicles examined by the author and from his experience he does not believe that because a vesicle is nodular it is necessarily tuberculous. H. L. SAXTORPH

Plaggemeier H. W. Tuberculosis of the Seminal Vesical and Epididymis. *L. A. C. C. T. R.* 1916 34

Tuberculous infection in the genito-urinary tract is as a rule secondary to a focus elsewhere in the body usually in the lungs intestines or bones. Primary tuberculosis of the genital tract has been demonstrated by a number of observers.

Guiley in 183 cases of urogenital tuberculosis found 10 cases involving the prostate and seminal vesicles alone. Saxtorph in a series of 70 cases noted 9 such occurrences. Walker found that the disease was stated to be primary in genito-urinary organs in 52 out of 144 cases but he found in experimental infections that the lungs were nearly always involved and showed the most advanced process.

Generally speaking genital tuberculosis is rare before the fourth month the percentage increasing to a maximum in the third and fourth decade.

In early life both sides are often affected but after 12 the majority of cases are unilateral. In Barney's series of 153 cases of epididymal tuberculosis 35 per cent were right 35 per cent left and 30 per cent bilateral.

The great mass of evidence points to the epididymis as the most common seat of primary infection in the genital tract. Cabot says: We should recognize that urinary tuberculosis is primary in the kidney and genital tuberculosis primary in the epididymis. Walker found in 270 cases that the kidney was first involved in 184 the epididymis in 80 the prostate in 6 and the seminal vesicles in 1. Keyes holds that the weight of evidence goes to show that in many if not all cases the prostate or vesicle is tuberculous before the epididymis becomes so. There is much authentic evidence that the epididymis is in most cases affected first.

Whether the normal seminal vesicle can harbor the cast-off tubercle bacilli without being affected or whether its secretion has a deleterious influence upon these organisms is as yet an unsolved problem.

Considering the rarity of primary infection of the seminal vesicle and the developmental analogy of the seminal vesicle and the urinary bladder the method of attack upon the kidney in bladder tuberculosis suggests the same rule in the vesicles and epididymis.

Much argument and many experiments have been put forth to prove extension of infection in each direction via the vas some holding that extension can take place only in the direction of the current and others that a reserved prostatitis is produced by irritation. Ascension by the subperitoneal lymphatics and the blood stream helps to explain the passage of the disease upward without general involvement of the vas. Ascension seems to be the rule descension the exception.

When tuberculosis involves the epididymis above epididymectomy should be performed. If both epididymes are involved double epididymectomy is indicated. Masculinity is not impaired and sterility has usually already taken place.

It is questionable if or whenotomy ever is indicated. When both epididymes and testes are involved it is better to incise and drain. The removal of a massively involved vas is advisable at all is best done by the high operation of Cabot. Removal of the epididymis and contiguous portion of the vas has had a signal effect on the process in the vesicles, the infection receding and the vesicles becoming fibrous.

If the process is confined to the vesicle vesiculectomy as advocated by Young is a splendid operation but if the prostate also is involved it should not be performed.

The prognosis of primary tuberculosis of the genitalia in children is usually good there seeming to be a limitation of tubercular processes in all organs in children except the meninges. In later life the tendency to wider involvement is a strong argument for radical operation.

Hygienic and climatic treatment both pre and post-operative is of importance. The author favors the Corbus idea of active immunization before operation.

The conclusions reached in the report of the Massachusetts General Hospital is that until ten years has elapsed no patient can be said to be cured of tuberculosis.

In conclusion genital tuberculosis in the male is a grave affection and except in the case of children operation affords the best means of cure.

The primary focus being removed the survival of the patient depends on the ability of his body to immunize itself against the disease. H. G. FLUKE.

Staley R. W. Treatment of Non-tuberculous Inflammations of the Seminal Duct. *L. A. C. C. T. R.* 1916 31

Surgical treatment of acute epididymitis has received considerable attention in recent years.

Epididymotomy is a simple operation and can be done in the office under local anesthesia. Pain is relieved promptly and resolution takes place more rapidly than by the expectant plan of treatment. Mild cases usually resolve fairly promptly under palliative treatment. The more severe cases justify epididymotomy. Relapsing epididymitis not dependent upon prostatic seminal vesicles or posterior urethral infection are most successfully treated by total extirpation of the affected epididymis.

Acute deferentitis usually yields to palliative treatment and rarely demands surgery except when abscess formation takes place in which case drainage should promptly be instituted.

The inaccessibility of the seminal vesicles and prostate has prevented more frequent use of surgical measures in acute conditions of these organs.

On this account palliative measures must suffice in the milder cases, and surgery be reserved for cases of well-defined abscess. Fuller incision or that of Young and Squer will be necessary to reach the vesicles, while a slight modification of lateral lithotomy will be sufficient in the case of prostatic abscess.

Non-operative treatment of acute prostatitis and vesiculitis includes rest in bed, application of heat by means of the psychrophore, restricted diet, antipyretic. All urethral manipulations should be omitted except catheterization when retention occurs. After acute symptoms subside massage is indicated and in the declining stage dilatations of the posterior urethra are of definite value.

Irrigations of the vas, ampulla, and vesicle with argyrol or protargol by Hefield a method is expressed in those cases where much debris is expressed by massage. In perivesiculitis with impotence not improved by massage or irrigations through the vas, a carefully performed vesiculectomy sometimes will restore the sexual function.

Gonorrheal arthritis is relieved in many instances by non-surgical measures, but vesiculectomy or vesiculectomy may be necessary for permanent relief in some cases. Vaccines, bacterial derivatives, and phytocogens have been generally disappointing.

His conclusions are Epididymotomy represents a decided advance in the treatment of acute epididymitis. Dilatation, massage, and irrigation will benefit and control the majority of cases of prostatic vesiculitis. Irrigation of the vesicle through the vas in properly selected cases is curative. Vaccines have some brilliant successes in their credit, and should still have a place in the treatment of these disorders.

H. G. HARRIS.

Silverberg, M. The Prognosis of Prostatitis. *Calif St J Med* 96 14 60.

There are two methods of determining the condition of the prostatic gland: (1) its palpation through the rectum and (2) the gross and microscopic examination of the fluid expressed from the gland. He states that the palpation of the diseased gland may be misleading in that it may be perfectly smooth and of uniform consistency but is usually slightly more sensitive to touch than the normal prostate. Irregularities in the size and shape of the gland are relatively common and are hard to interpret. In the microscopic examination of the expressed secretion the presence or absence of pus cells and their relation to the number of lecithin bodies present should be noted. These findings are subject to the following errors: (1) the distribution of the pathological elements may be uneven and the material used in the examination may be from the normal portion of the gland likewise the marked involvement of a small focus may furnish enough pus to diffuse throughout the entire specimen and the error would be made of diagnosing a diffuse disease of the gland whereas in reality there is

present only a small focus of disease. The third factor in determining the prognosis is the reaction of the patient to the various treatments.

The author states that these conditions sometimes clear up without treatment but usually do not. Most of the cases persist with marked obstinacy. He states that after a given method of treatment has been used for a few weeks if the patient does not improve the method should be changed either in whole or in part and this plan should be persisted in until a method suitable for that particular case is obtained. The author summarizes as follows:

It is desirable that prostatitis be cured in every case but treatment frequently fails or is otherwise unsatisfactory.

The outlook is an important matter to the individual as well as from the standpoint of social hygiene prophylaxis.

3. The probable issue is suggested by the history, clinical findings, and by closely following the effects of treatment.

4. There is really no scientific method of establishing prognosis, though bacteriology may avail here.

5. The duration of treatment is uncertain.

V. D. LEVINE 1847

McCarthy, J. P. Some Features of Importance in the Diagnosis and Prognosis of Urogenital Tuberculosis. *Surg Gyn & Obst* 96 31 330.

The author calls attention to the importance in urogenital tuberculosis, of investigating the deep urethra as well as the bladder. He comments on the frequency (hitherto insufficiently emphasized) of the associated involvement of the reticular structures even in the presence of unilateral renal tuberculosis.

Attention is also called to the fallacy of operative procedure such as epididymectomy etc without the most careful inspection of the posterior urethra.

The author feels that while it is generally recognized by urological surgeons that operative intervention such as nephrectomy etc for tuberculosis should be regarded merely as the preliminary step in the treatment of a constitutionally tuberculous subject, altogether too little emphasis is accorded this fact in operative clinics as well as the hospital care of such cases.

Finally he emphasizes the supreme importance of universal take care of the surgical tuberculous, non-operative and post-operative subject, from the economic and humanitarian standpoint.

MISCELLANEOUS

Hanzlik, P. J. Hexamethylenamine as a Urat Solvent and Diuretic, and Its Effect on the Reaction of Urine. *J Lab & Clin Med* 96 13

The author exhaustively reviews the literature in order to find the truth about the alleged urate and uric acid solvent properties of hexamethylenamine.

e. The chemistry and behavior of various so-
lved urate solvents indicate only very slight
degrees of success under the conditions existing in
the body.

Urate or uric acid solubility depends largely on the
free of reaction (hydrogen ion concentration)
the concentration of fluids and there is no
evidence to show that hexamethylenamine has
any particular influence in this respect.

Recent and reliable evidence shows definitely
that therapeutic doses of the drug impart to the
urine no demonstrable uric acid or urate solvent
properties. Excessive doses impart only slight and
clinically negligible solvent effects. A greater
effect would be obtained at a much lower cost
than any of the common alkaline diuretics.

There is no evidence that hexamethylenamine can
dissolve urate calculi.

No substance has yet been discovered which
could form either soluble or easily oxidizable com-
pounds with uric acid, under the conditions obtain-
ing in the body.

F. E. C. ARDRE.

Rebel, A. J.: Genito-Urinary Symptoms Arising
from Anal Rectal and Colonic Diseases, and
Vice Versa. *J. Am. Med. Ass.* 96: 171, 1908.

Iterative conditions in and about the anal region
such as fissures, chancres, chancroids and perianal
hemas are reflexly the cause of frequent and pain-
ful micturition. In acute proctitis or acute dysen-

tery and in the presence of inflamed and ulcerated
hemorrhoids there is sometimes reflex dysuria and
vesical tenesmus due solely to an irritable rectal
condition. Cancer of the rectum is usually so in-
sidious in its growth that an anuria may be one of the
first symptoms of the disease. A syphilitic stricture
of the rectum is also apt to be quite insidious in its
formation and may give rise to scarcely any rectal
symptoms even though it has developed a consider-
able degree of obstruction of the bowel.

Abnormalities in the urine resulting from colonic
conditions solely are occasionally met with. Trans-
parietal infection through the lymphatics from the
intestine may be the cause of a cystitis. An en-
largement of the inguinal glands occurs with chancre
of the anus. Urethral stricture, polypsi in the
urethra especially of the deep urethra or its adnexa,
phimosis, stones in the bladder, gonorrhea in women,
and enlargement of the prostate gland are some of
the more common reflex causes of anal itching. On
the other hand, the author states that he has seen a
very severe scrotal and perineal pruritus caused by
leucorrhea entirely within the anal canal.

Neoplastic growths of the bladder, prostate and
seminal vesicles may give rise to rectal symptoms
such as are common in the early stages of rectal
cancer. In consequence of abscess formation from
disease or injury to the genito-urinary tract a
fistulous tract opening into the rectum is very
liable to result.

H. A. MURPHY.

SURGERY OF THE EYE AND EAR

EYE

EAR

Verhoeff, F. H. Rosacea Keratitis and Certain Other Forms of Marginal Keratitis, Neuropathic in Origin; Treatment by Pericorneal Neurotomy. *Arch. Ophth.*, 9 6 xl 144.

Not generally known is the fact that with acute coryza and gastro-intestinal disturbances, herpetic lesions limited to the periphery of the cornea and of a highly distinctive character may occur.

The author contends that as they are uniformly located 1.5 mm. from the limbus this shows that they occur at the terminations of the conjunctival nerves in the cornea, and lesions situated 3 or 4 mm. from the limbus are explained by assuming that some nerve branches extend unusually far.

Since it is generally accepted that facial herpes is neuropathic in origin, it is regarded as altogether probable that these peripheral corneal lesions are likewise so, and the author's explanation of neuropathic keratitis in general is that impulses from the affected ganglion cells pass backward along the ordinary sensory nerves to the nerve terminations in the cornea where they produce by electrolytic dissociation, toxic substances injurious to the tissues.

Rosacea keratitis is also regarded as a form of neuropathic keratitis, and acting on the above theory the author does a partial peritomy to interrupt the injurious impulses, with the result that in fifteen cases operated on during the past year he has secured prompt healing in all, with no recurrences.

Rosacea of the skin, being regarded as an angioneurotic condition due to some abnormal constituent of the blood, he correlates with the corneal lesions by assuming that the same deleterious agent acts on the ciliary ganglion and through this on the skin and cornea. S. S. HOWE.

Dehobues, T. L. Treatment of Gonococcal Conjunctivitis by Autogonococcal Serum (Tratamiento de la conjuntivitis blenorragica por el suero antigonococcal). *Rev. d. med. y cir. de la U. de* 9 6 xli 99.

The author reports 8 cases successfully treated. The first hypodermic injection of the serum consisted of .ccm. Subsequent injections of .3 ccm. were made every three or four days. After the fifteenth day of treatment no gonococci were found in the secretions. Corneal ulceration was found in one case, but was slight and yielded to special treatment. There were no phenomena of anaphylaxis and no nervous symptoms.

W. A. BREYER.

Smith, S. M. Aural Complications of Influenza. *Therap. Gaz.* 9 6 xl, 65.

Otitic influenza like other inflammatory changes due to the bacillus of influenza is distinguished by the intensity, rapidity and virulence of action frequently involving the mastoid and other adjacent structures, with absence of the usual symptoms. The initial observable inflammatory process is a severe myringitis, hemorrhagic in character with spontaneous rupture of the membrana tympani in forty-eight hours. Early free incision of the membrana tympani with rest and general eliminative treatment are the best prophylactic measures.

ELLEN J. PATTERSON.

Packard, F. R. Report of a Case of Acute Mastoiditis, with Influential Meningitis; Treatment by Operation on the Mastoid and Anti-Influenza Serum. *T. Am. Otol. Soc.* Washington 9 6 xl v.

The patient a young girl eleven years old, following severe chills developed what was apparently a grippy attack and an acute otitis media in her right ear. The author incised the membrana tympani and evacuated some pus and the next day she had distinct symptoms of a mastoid involvement, accompanied by some ataxia, marked Kernig sign, photophobia and muscular rigidity of the neck. The mastoid was opened and at the same time lumbar puncture was performed. The fluid withdrawn from the spinal column showed an influenzal bacilli. Fletner anti-influenza serum was injected into the spinal column. Several such injections, each of which was followed by marked improvement in the patient's condition, were used in the course of the week subsequent to the mastoid operation and the development of the meningeal symptoms. The child's mastoid wound did well, the meningeal symptoms practically subsided and marked drowsiness developed with a recurrence of the symptoms of meningeal irritation. The diagnosis of abscess of the temporosphenoidal lobe was made and the cranium opened and pus evacuated. The child when made an uninterrupted recovery.

Dench, E. B. Acute Mastoiditis with Unusual Symptoms Indicative of Intracranial Involvement; Operation; Recovery. *T. Am. Otol. Soc.*, Washington 9 6 May.

The patient, a young woman aged 7 was operated upon for mastoiditis on the eighth day after the inception of an acute otitis media. The

mastoiditis was found to be of the hemorrhagic variety. Convalescence was slow and six weeks after the operation the patient was again admitted to the hospital suffering from severe headache general neurathenic symptoms and mental depression. At this time there appeared also an abducent paralysis upon the affected side. There was no evidence of any labyrinthine involvement and no aphasia. The spinal fluid was negative and the ophthalmoscopic examination showed each ocular fundus normal.

On account of the severe headache a large area of dura was exposed in the middle cranial fossa and the dura stripped up from the floor of the middle fossa as far as the apex of the petrous pyramid. No extradural collection of pus was found and no collection of pus was found in the old mastoid. The patient made a complete recovery. The headache immediately disappeared and the abducent paralysis disappeared. A rubber tube drain had been inserted deep in the middle cranial fossa at this operation. Three days after the operation swelling of each optic papilla was noted—more marked upon the operated side. The rubber tube drain was removed and the patient rapidly disappeared.

While the case presents many of the symptoms first described by Gradenigo it differs from them in that in these cases some purulent focus has usually been found at the time of operation, the presence of which explained the symptoms. In this particular case no such focus was found. It seems probable to the author that the cause of the unusual symptoms was a low grade of inflammation spreading along the dura to the apex of the petrous pyramid as an area of dura in the middle fossa was exposed at the time of the mastoid operation. This meningeal inflammation probably caused a certain amount of pressure upon the gasserian ganglion and also upon the sixth nerve causing the severe neuralgic pain in the head and the paralysis of the sixth nerve.

Dench E. B. *Obscure Cases of Mastoid Involvement*. *A. J. S. J. p. 100, 1915.*

This report does not deal with cases where the diagnosis is so evident that it can be made by a glance at the patient but rather with those cases in which the development of the inflammatory process is so insidious and the symptoms so slight that a diagnosis is made with the greatest difficulty.

The author reports several cases in which the middle-ear condition had cleared up or was rapidly clearing up but in which the inflammatory process in the mastoid was rapidly progressing as was demonstrated by the operation. From such cases the author draws the conclusion that the actual cessation of discharge is no absolute indication that the mastoid is healthy. Such being the case the

author attempts to show how one can tell in a given case of a late aural suppuration that there will probably be serious mastoid involvement or how one can tell in a given case that any involvement has entirely disappeared when the middle ear has completely recovered.

The following diagnostic signs are mentioned:
1. As to the site of the inflammatory process the author states that inflammations confined to the lower part of the tympanic cavity are much less liable to be followed by serious mastoid infection than cases in which the upper part of the cavity is involved.

As to the duration of the discharge the author believes that middle ear involvement which does not resolve entirely at the end of two weeks is one of mastoid involvement sufficiently extensive to demand at least exploratory operation.

Concerning tenderness on pressure over the mastoid the author states that tenderness at the beginning does not mean much but tenderness after the fourth or fifth day is of great significance and he adds that tenderness over the antrum is of more significance than tenderness over the tip.

The nature of the discharge is of importance. A streptococcus infection is more likely to result in mastoid infection requiring operation than is a staphylococcus infection.

The sign upon which the author places most reliance is a narrowing of the external auditory meatus near the drum.

Another important nasal sign is an actual shortening of the external meatus a condition in which the entire drum membrane appears nearer to the entrance of the canal than under normal conditions.

The above signs acquire additional importance where the opposite canal is normal in caliber and length. Concerning the swelling of the canal caused by furunculosis the author notes that this narrowing is more superficial than the narrowing due to mastoid involvement. When in doubt the author opens the mastoid.

8. Roentgenograms are mentioned as of great assistance.

9. The general symptoms mentioned as of diagnostic importance are persistent headache and sleeplessness.

As to temperature and the differential blood count the author is not much influenced by their absence.

In closing the author cites a case illustrative of the diagnostic importance of recurring attacks of acute otitis in pointing to mastoid involvement. The author feels that this sign needs more careful consideration as he argues that these attacks would not recur unless a purulent focus existed somewhere in the deeper structures of the middle ear.

ORR M. ROTT

SURGERY OF THE NOSE THROAT AND MOUTH

NOSE

Veney, C. A. The Diagnosis and Treatment of Inflammatory Affections of the Nasal Accessory Sinuses. *Northwest Med.* 9 6, xv 73.

After alluding to the importance of sinus disease as a causative factor in many gastro-intestinal affections, as well as to the sinus affecting other portions of the body the author considers the sinuses collectively and mentions the well known symptoms of headache, tenderness, nasal obstruction and discharge, dizziness and vertigo as well as prostrata and neurasthenic symptoms in general.

As to diagnostic methods the author mentions transillumination as one of the best aids. Other aids, as the pharyngoscope, X-ray puncturing and irrigation of the antrum and the application of suction to the nose are favorably commented upon.

As to treatment of the acute condition, the author mentions the necessity of securing adequate drainage and ventilation, and this is secured by shrinking the nasal mucosa by the application of weak solution of cocaine instead of adrenalin, as the latter is apt to produce a secondary swollen condition greater than was primarily present. After the membrane has been shrunk, the author describes with a normal saline solution or with mild alkaline solution followed by an application of a 25 per cent solution of argyrol and a oil spray. The patient is instructed to douche his nose freely with hot normal saline solution every hour or two and to take deep inhalations every two or three hours of compound tincture of benzoin and menthol, four ounces of the former and one drachm of the latter, two table-spoonsful being used in one-half pint of boiling water. General treatment with calomel, saline aspirin and phenacetin is recommended.

The indication for the treatment of the chronic cases is likewise drainage whether obtained by the correction of obstructing septal deformities or by petrosphenoidal turbinates. After drainage has been obtained irrigations are advised and when these prove futile operative interference is justified. The author has little faith in the beneficial influence of autogenous vaccines. Otto M. Rott

Gatwood, W. E. Carcinomata of the Nasopharynx. *J Am Med Ass.* 9 4, 141 499

From a review of the literature the following points are gleaned:

Carcinomata of the nasopharynx are characterized by a rather long latent period and most of them originate in the vault or on the posterior wall. They are more prone to ulcerate and lead to epistaxis than other malignant tumors of this region. Extension

may take place in four ways: (1) by the inferior or pharyngeal route (2) by lateral prolongation (3) by the anterior or nasal route (4) by the posterior or cranial route.

Carcinomata of the nasopharynx very rarely produce visceral metastases but as a rule they give earlier adenopathy than other tumors of this region. About 60 per cent of the carcinomata in this organ occur in individuals between 4 and 60 years of age but they have been noticed in children as young as 3, 6 and 10 years of age. Otto M. Rott

Molina De Saut Remo A. H. Migraine. *N Y J* 10 6 498

Migraine is a nasal organ lesion. It is produced upon the upper part of the nasal cavity by swelling of the mucosa of the middle turbinate impeding gas to a certain high position of the nasal septum. It is distinct from the local circulation and exists in the paranasal sinuses. The treatment indicated is thorough complete submucous resection of the nasal septum with care to avoid perforation. J. P. Rarue

Callison J. G. Papilloma of the Nose. *La J* 10 6 1 53

The (short) report of a case of true papillary fibroid in a colored woman aged 4, who had been of 10 years duration and previously operated upon. When first seen by the author the left nostril was filled with a growth which presented dry, dark, and wrinkled appearance. The nasal cavity was so completely filled with the growth that a snare could not be passed round it much less the site of origin determined. To effect removal, the growth was removed by the use of the low forceps and thus its origin from the lower border and external surface of the middle turbinate was determined. Microscopical examination revealed the nature of the growth. Of particular interest was the appearance of the epithelial cells which retained their columnar character even to the surface. Other features of interest in the histological sections were the intense purulent infiltration of the epithelium and its absence from the connective-tissue stroma, the pus-cells in places collecting in to groups and forming cystlike spaces.

The growth had a tendency to recur so in order to eradicate as thoroughly possible the base of origin and hence to prevent the danger of malignant change the author intends performing a Caldwell-Luc operation, followed by a radical Moshé operation. After this careful cauterization of the tissues with a chemical substance such as trichloroacetic acid will be made. Otto M. Rott

Dabney V: Deaths Attributable to Intranasal Operations and Other Instrumentation *Surg Gynec & Obst* 916 xiii 324.

Deaths following cauterization of the nasal mucosa diagnostic puncture and irrigation or mere perforation of the antrum of Highmore are not to be expected but it is surprising that more deaths do not follow probing of sinuses resecting the septum or removing the middle turbinate in part or in its entirety. Polyp removal is more dangerous than believed for the same reasons as they indicate deep-seated disease and periostitis. Infection is accounted for by the virulence of the bacteria opening wide spaces for absorption of toxins trauma and continuity of tissue. The lymphatics rarely transmit infection which travels by the blood stream or by actual continuity as a rule. Cocaine was not responsible for any deaths though adrenalin was. Numerous authors are cited to show that adrenalin with light chloroform anesthesia is peculiarly dangerous even with light etherization it is thought risky. Deaths due to adrenalin were 4 to hæmorrhage 3 to packing nose for epistaxis 1 to puncture or injection of air or fluids into the antrum of Highmore 10 to probing and irrigating frontal sinus 3 to polyp removal 9 to ethmoid curettement 4 to turbinate operations 9.

In the author's personal case following resection of the lower edge of the inferior turbinate of one side the patient never recovered consciousness from the ether and died in three days from a cerebrospinal meningitis. It was probably a case of latent meningitis before operation. One death was due to exploration of the sphenoidal sinus 9 deaths resulted from resection of the septum. Deaths from invasion of the antrum of Highmore are due to reflex irritation of the vagus through the irritation of the second branch of the trigeminal which supplies the interior of the antrum. It is demonstrable that the interior of the nose is a zone of considerable danger for even the slightest instrumental interference and that adrenalin combined with a general anæsthetic especially when used for operative assistance is not to be lightly employed.

Blackburn W J: Submucous Resection of the Nasal Septum *J Ophth Otol Laryng* 91 xvi 8.

The universally gratifying results in a series of over a hundred operations for submucous resection of the septum leads the author to conclude that a deviated septum may be the underlying cause of many diseases of the nose throat and ear. By obstructing the nasal respiration the resistance of the tissues of the nose and throat are lowered and patients with deviated septa frequently develop ethmoiditis sinusitis suppurative otitis media mastoiditis with brain abscess laryngitis bronchitis chronic head deafness tinnitus aurium asthma hay fever or other neurotic conditions.

LITERATURE.

Sludce G: A Galvanocautery Operation for the Lower Turbinate *Laryngol* 916 xxi 66.

The pathological condition for which this technique is recommended is general swelling (hypertrophy or intumescence) of the soft parts covering the lower turbinates the clinical condition being for the most part nasal obstruction with or without eustachian tube irritation.

To the anteroposterior incision usually made in cauterization of the inferior turbinate the author has added (1) a straight one descending in front at an angle of 45 degrees from a point a little above the line of attachment of the body of the turbinate to meet tangent the anterior limit of the anteroposterior incision and then descending below it to the level of the free margin of the vestibule almost to the mucocutaneous junction in the vestibule (2) two curved incisions on the body of the turbinate posteriorly which are made operating from the postnasal space by means of a specially curved cautery tip introduced through the mouth behind the soft palate. One curved incision is made above and one below each beginning 1 to 1.25 cm. in front of the posterior tip and extending backward to meet on the lateral wall just at the tip (3) the tip of the cautery is extended forward to a point which is to be the posterior end of the anteroposterior incision and carried backward over the tip to the junction of the curved incisions or even as far backward as the cartilage of the anterior lip of the mouth of the eustachian tube especially in those cases associated with tubal irritation.

For all this work the author uses an electrode which has no insulation upon it and which consists of the two upper wires which are united by a platinum-iridium tip. This permits the wires to be separated and spread apart as far as 1 cm. if desired which transforms the narrow tip into a V or U shaped end as desired. When this is used on the pull any tissue to be removed can be engaged in this loop and the current turned on, when it acts like a spokeshave.

The author has a definite order of procedure in this work which is as follows.

After anesthetizing the turbinate and soft palate the latter is forcibly drawn forward by the author's self retaining palate retractor. A large warm post nasal glass is used as a tongue depressor. The curved electrode is then introduced cold in a horizontal plane through the mouth into the pharynx. The glass is then slipped back into the postnasal position and the tip of the cautery is brought forward into the affected nostril put in place and the current turned on. First the lower curved incision is made near the posterior end of the anteroposterior incision and then the upper curved incision. This completes the work from the postnasal side. From in front the author introduces a straight tip to meet the middle posterior incision and carries this forward until he reaches the anterior end of the incision where he changes the direction of the tip placing it near the anterior tip of the middle tur-

binate, when it is drawn downward and forward to its prescribed lower limit. The tip used is so blunt that if it were once removed from the tissue it would burn itself out.

The author has employed this procedure in more than 1,000 cases extending over a period of seventeen years. Out of this number 3 cases required an anterior packing with Simpson's spatula to control bleeding. In none of the author's snare and scissors operations has the result been so satisfactory as with this method. The author has never seen the permanent drying or crusting mentioned by some men. This method is also applicable to snaring off the posterior end of the inferior turbinate.

Two cases are reported in which deafness, not responding to any of the operations for nasal obstruction, has responded to this method of cauterization especially when the posterior line extended to the anterior tip of the pharyngeal orifice of the eustachian tube.

OTTO M. ROSE

Kellogg, F. B. An Improved Submucous Operation.
J. Ophth. Otol. & Laryngol. 9 6, xiii, 5

The author makes his primary incision from high up in front of the deviation on the convex side down to and half way across the floor. Then elevating the membrane above and below the edge of the ridge until the mucous membrane of the convex side is free except along this edge he inserts the blades of a delicate pair of scissors one above and one below the ridge and trims off the edge of the ridge leaving it attached to the membrane. After elevating the membrane on the concave side he inserts a Bowman's saw under the dissection inside the membrane saws off the projecting spur in the plan of the septum removes the spur with forceps, and packs with strips of spunk.

ELMER J. PATTERSON

THROAT

Hays, H. A Simple Tonsil Operation Under Local Anesthesia. *Med. Rec.* 9 6 Jul 4 9.

Using Schleich infiltration anesthesia the author depresses the tongue firmly and separates the tonsil capsule from the anterior pillar working from below up with his double bladed knife. Then using his modified aneurism needle threaded with stout cord or suture, he threads the cord in the deepest part of the tonsil from below upward ties it and using the cord as a retractor completes the dissection with Hurd tonsil separator or his index finger.

ELMER J. PATTERSON

Shearer T. L. The Question of Age in Tonsillectomy.
J. Ophth. Otol. & Laryngol. 9 6, xiii, 205

Tonsillectomy is indicated in adults under 40 years, when the patient has hypertrophied or diseased tonsils or the tonsils are the focus of infection of pathological conditions remote from the tonsil. It is indicated also in malignant disease of the tonsil irrespective of age followed by radium radiation of the wound.

Tonsillectomy is contra indicated in any adult suffering from arteriosclerosis, and adults over 45 are treated satisfactorily by the electrocautery.

ELMER J. PATTERSON

Friedberg, S. A. Removal of Tonsils and Adenoids in Diphtheria Carriers. *J. Am. M. Ass.* 9 6 Jul, 8

Several instances have been noted in which the local application of kaolin seemed to be without any effect on diphtheria bacilli. In view of the prompt disappearance of the bacilli in these cases after tonsillectomy and removal of adenoids the author makes a brief report of the results.

Six cases are reported five occurring in children. The tonsils were removed after all methods were used to rid the throat of diphtheria. In two days or less the cultures became negative.

In none of these patients did the operation have any different general effects than it has ordinarily. In all of the patients the Schick test gave negative results just before the operation. Six successive negative cultures were required before the patients were discharged.

The results obtained in this series indicate clearly that in persistent carriers it may be necessary to remove the tonsils and adenoid tissue if it is desired to terminate the carrier condition promptly.

The bacteriologic examination should be made with care as it is well known that applications of medicinal agents may destroy the bacilli on the surface while leaving unaffected those in the crypts of the tonsils and the folds of the adenoid tissue.

As to the time the operation should be performed it is perhaps advisable to wait from two to three weeks after the clinical recovery of the patient. In the case of the chronic carrier no time limit is necessary.

EDWARD L. COMELL

MOUTH

Durante, L. Tuberculosis of the Tongue. *A. Surg. Pathol.* 9 6 Jul, 43

In addition to reporting 5 cases of tuberculosis of the tongue, the author gives a very complete bibliography of the literature upon this unusual disease. He has been able to collect about 350 cases, some of which, however, have been recorded without anatomico-clinical details. The reason for the relative infrequency of the lesions on the tongue, an organ which comes in contact with almost all tuberculous infecting material, is due probably to two factors: (1) to the particular structure of the lingual mucosa which resists the direct penetration of the bacillus tuberculosis and (2) to the natural resistance which all striated muscle presents to the lodgment of the bacilli. Almost all of the cases cited occurred between the twentieth and fiftieth year, a condition has been recorded as occurring in infancy, the age in which tuberculous lesions are so common and widespread. From these considerations the author concludes that the tuberculous process in the tongue

is assisted by such lesions as trauma of the mucosa by pipe stems, by carious teeth by toxic glossitis etc., and that as these causes are more frequent in men than in women lingual tuberculosis is to be expected more frequently in men. Statistics bear out this contention as Chvostek reports one man to every four men and Delavan records nine in twenty three.

While theoretically tuberculosis may be localized in the tongue by the blood vessels by the lymphatics by direct infection, or by extension from surrounding organs practically it is impossible to determine the exact method of infection. Many of the cases reported in the literature as primary tuberculosis were not controlled by autopsy so that the term must be accepted in the clinical sense only. The theoretical possibility of a primary tuberculosis of the tongue is practically confirmed by two cases which the author collected in which the patients died from other causes and careful post mortem examination gave no evidence of tuberculous infection in other organs. In the majority of cases the localization was secondary to a tuberculous process elsewhere in the body. From the histologic examination of the tissue removed from the living patients reported by the author and from the statistics collected by him the indications all seem to point to a hematogenous infection as the most common in method of infection of the tongue by tuberculosis.

The anatomical forms of the disease do not represent a distinct anatomical entity but diverse forms of the same evolutionary process depending upon the virulence of the bacilli the local resistance of the tissues, and the systemic resistance of the patient, are found in various cases and in various parts of the tongue in the same case. The beginning is always characterized by new formation of tuberculous nodules which may be localized separately in the dermis of the mucosa or in the lingual parenchyma. From this initial localization of the tuberculous process two clinically different types may originate. The first presents itself initially as a plaque of gray color somewhat elevated above the surrounding mucosa hard to the touch and without inflammatory reaction. It resembles cutaneous lupus and is very often accompanied by lupous lesions of the buccal mucosa of the nose or of the skin of the face. This type is referred to as glossodermatitis tuberculo-fibrosa or should it ulcerate as glossodermatitis tuberculo-ulcerosa. When, on the other hand the parenchyma of the

tongue is primarily affected nodular tuberculosis may result or the lesions may become confluent or disseminated in various regions—disseminated milary tuberculosis of the tongue. The second type in any of its various forms may maintain its individuality for months or years simulating either a neoplastic lesion or the localization of tertiary lues. The typical tuberculous ulcer has irregular margins and is soft and reddened with a soft yellow base. It may appear in any region of the tongue but with more frequency on the margin and the tip. The adenitis which accompanies it is often bilateral and lightly painful to pressure. Usually there is not much difficulty in finding the bacilli in tuberculous glossitis although undiluted case has been reported with the bacilli being found.

The symptoms vary considerably with the stage of evolution of the disease. The initial period is marked with few or no subjective symptoms. When the ulcerative form develops there is abundant irritation and some pain due mostly to the passage of food. The pain may limit the mobility of the tongue. In the ulcerative type which is complicated by secondary infection there is usually painful general adenopathy but in the closed form of lingual tuberculosis it is often absent.

Diagnosis in the early stage of the process presents great difficulty. Mistaken for pythelomatous neoplasms amputations of the tongue with radical removal of the glands of the neck have been done for tuberculous glossitis. Mercurial treatment has been employed in 180 reported cases showing the frequency with which it has been mistaken for tertiary lues. There are no sure criteria of differentiation and it is always well in case of doubt to employ the microscopic examination of the tissue of the lesion. This can usually be done by frozen sections during the operation as was done in each of the cases reported by the author.

The prognosis is favorable when the tuberculosis of the tongue presents itself as a primary and unique lesion. It is generally unfavorable when the lingual lesion is a late localization secondary to a broncho-pulmonary process.

The treatment of election which has been avoided by previous authors has been operative when the tuberculous lesion of the tongue was single and circumscribed. In the multiple and diffuse lesions the treatment recommended has been local with the cautery.

(TEN 300)

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- Oral sepsis focus of infection. B. C. HAVENES. *Am. J. Roentgenol.* *g* 6 li, 28.
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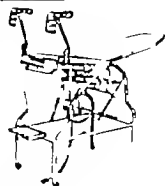
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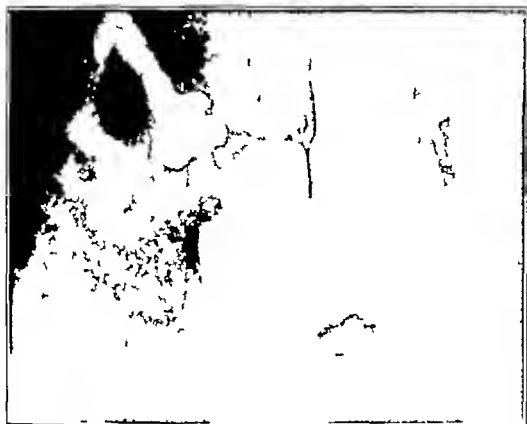
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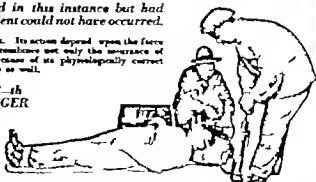
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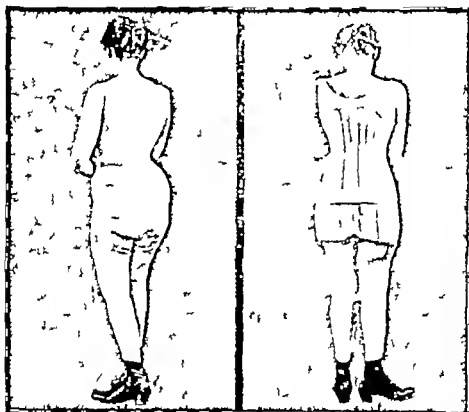
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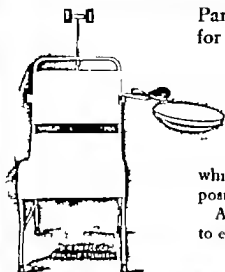
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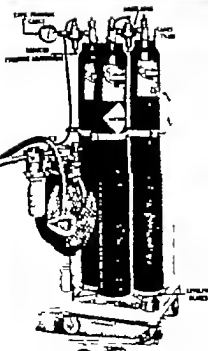
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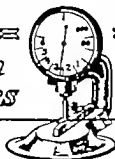
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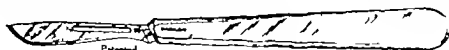
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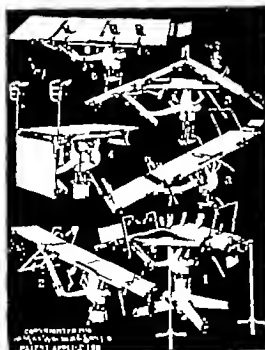
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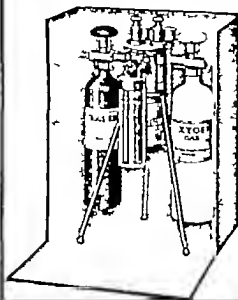
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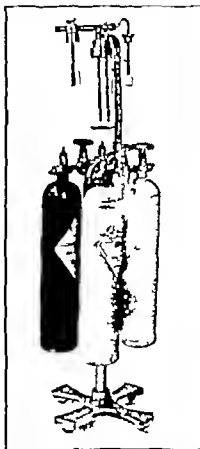
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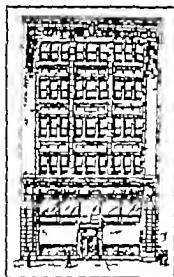
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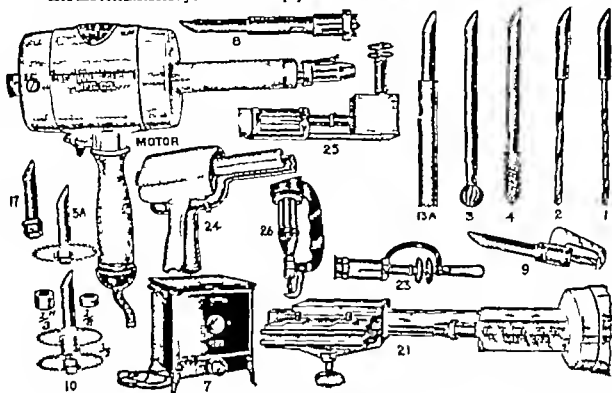
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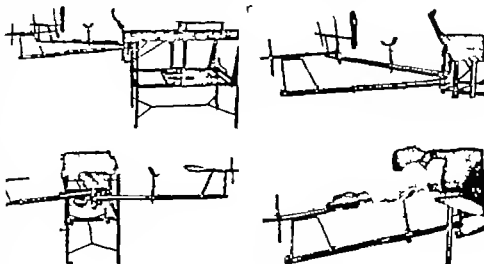


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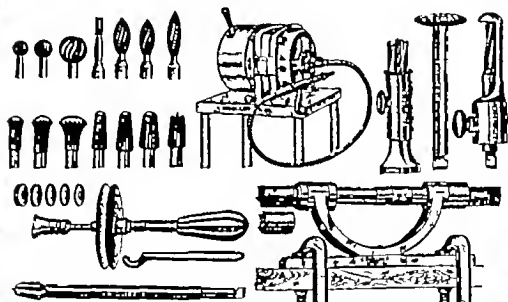
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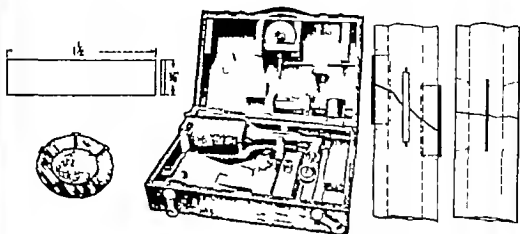
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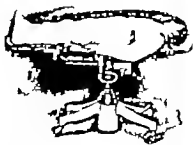
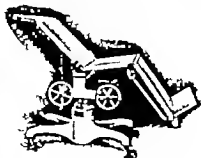
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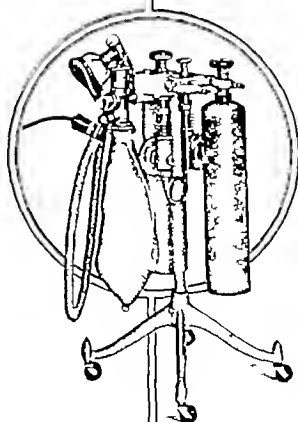
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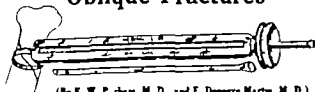
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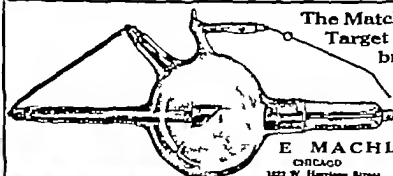


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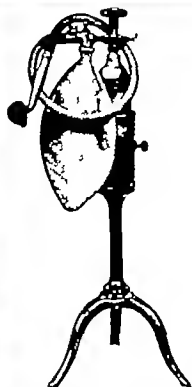
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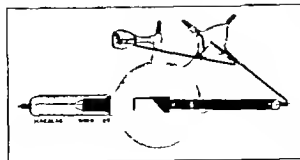
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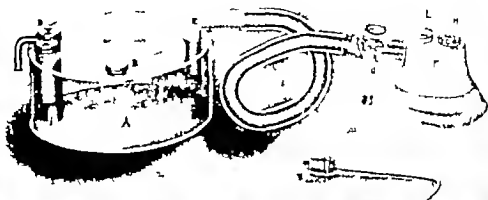
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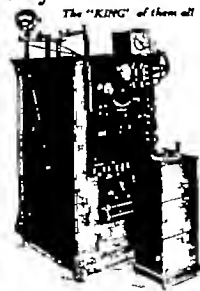
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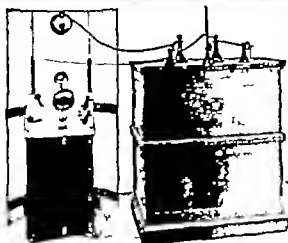
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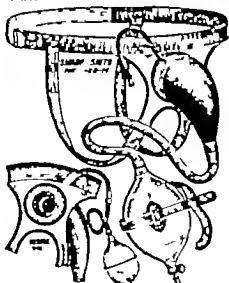
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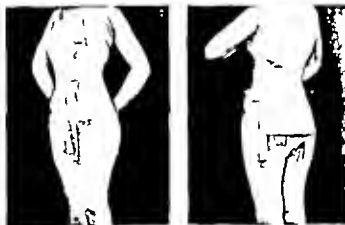
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FOUNDER AND REGENT
AMERICAN COLLEGE OF SURGEONS

HONORARY FELLOW
ROYAL COLLEGE OF SURGEONS OF ENGLAND

DIED AUGUST 11 1916

An Appreciation

DR. JOHN B. MURPHY possessed those intellectual, physical, and personal qualities which make a surgeon. After graduating from Rush Medical College in 1879 and serving an internship in Cook County Hospital Dr. Murphy went to Vienna and came under the direction of that master surgeon Billroth, then at the height of his great career. Billroth was a man of charming personality and most original mind, and his students today fill the chairs of surgery in many Teutonic universities. During these formative years of Dr. Murphy's European sojourn Albert was also one of his favorite teachers. Few men ever equaled Albert's ability to logically present clinical surgery. Fired with zeal Dr. Murphy returned home and came under the influence of the father of modern surgery in the West — Christian Fenger — who was unequaled as a teacher of surgical pathology. Dr. Murphy combined the qualities of Billroth, Albert, and Fenger.

The reputation of a surgeon, in the final analysis, must rest upon (1) originality (2) teaching by word of mouth (3) teaching by the printed word, and (4) surgical judgment and operative skill.

Dr. Murphy had a marvelously fertile and original mind. Possessing a brilliant surgical imagination, he early deviated from the beaten paths and invaded new territory and yet with such acumen that nothing which he originated has failed to live. Like those of the great *musicians*, his productions are still masterpieces; they mark epochs in surgical progress. He made the experimental laboratory a hand maiden to surgery and carefully investigated every detail of his constructive work by animal experimentation before applying it to man.

As a teacher of surgery by word of mouth he had, in my opinion, no equal. Clear and logical, he started with facts about which there could be no dispute, progressed from these facts toward new ground, yet along pathways more or less familiar to all, and finally taking us by the hand, so to speak, he led the way to new truths by the light of his surgical genius.

As a writer he was prolific. His early work was in the field of abdominal surgery. The Murphy button taught us to solve many problems connected with gastro-intestinal surgery. His monograph on "Ileus" still stands a monument to his scientific ability. The history of surgery of the appendix, pelvis, and upper abdomen, as well as of the kidney shows evidences of his genius. Dr. Murphy next developed surgery of the lungs and, in the oration on surgery delivered at Denver in 1898, he laid the foundation for modern surgery of the lungs, so far ahead of his time was this that we have only of late awakened to an appreciation of its value. Dr. Murphy's work on surgery of the nervous system helped to lay the foundation for the present practice, and again his latest work on bones and joints, in which he was engaged during the closing years of his life, are perhaps the greatest contributions to these subjects of our generation.

Dr. Murphy was skillful as an operator of fine judgment, humane, sane, sound, and free from fads. What surgeon has not felt, on seeing him operate, a just pride in the science and art of surgery and expressed the hope that in the event he or a member of his family must have an operation, so good a surgeon as Dr. Murphy might perform it?

The American surgical profession has lost its leading spirit. In Dr. Murphy's death at the age of fifty-eight, well may we regret the unfilled twelve years which go to make up the allotted span of man. And yet, when we review what he has done, we freely acknowledge that even in the time the light lasted he accomplished more than any other surgeon of his time.

William J. Mayo

Our Chief of Staff

JOHN B. MURPHY was the underlying support of SURGERY GYNECOLOGY AND OBSTETRICS and the INTERNATIONAL ABSTRACT OF SURGERY from the time of their inception to the day of his death. He was the inspiration for every move of merit that SURGERY GYNECOLOGY AND OBSTETRICS has stood for and fathered. He was the adviser, personal friend and aid to the editor and his associates, and when difficult problems arose, his strength of character, his personality and his power of vision all were contributed unsparingly toward right solutions. Dr. Murphy was one of the few who maintained at the first conception of the Journal that it would succeed if it were comprehensive and served the needs of the surgeon. And to this ideal he inseparably attached his program of personal energy and financial support.

When the Clinical Congress was developed through an informal invitation of the Journal, both the surprising response to this call and the far-reaching benefits it offered to surgeons fired his imagination and he declared for a permanent organization. Through his force the organization became swiftly the great clinical society that he predicted for it; it served the practical needs of the surgeon.

When at the third session of the Clinical Congress some discussion arose as to whether America should have a great society for the advancement of surgery, it was Dr. Murphy who was recognized by the President of the Congress to second the proposals of the officials. On that occasion he made such a compelling appeal that every man in the audience grasped not only the great vision but also how the vision could become fact. On his motion then the committee of nine was authorized and the American College of Surgeons ceased to be a dream and became a certainty.

These three organizations, which have become powerful agencies throughout the medical world, were but important incidents in the constructive mind of Dr. Murphy. But each of these organizations owes its existence to his enthusiastic support to his uncompromising determination that each represent fundamentals of progress in surgery which are worth while.

The personal loss to the staff of the Journal is too great, and at this time the heart is too full to dwell here on more than the mountain peaks of his service. The details of a wonderful association and friendship are sacred, and the writer mourns the loss of the greatest friend he ever knew.

John Benjamin Murphy

*He went away as he had lived nobly careless of himself
and thinking only of the things he had undertaken to do*

By thought, by action and by self-discipline, he trained a body and mind given by a pure inheritance into a strong physique, an acute brain and a dominating personality

With unsatisfied industry he acquired the knowledge of his art and made his mind a possessor of the recorded deeds of his confrères of the world

He learned surgery serving with indefatigable energy the needs of helpless humanity and taking counsel of his fellow workers in every field old and new in which his profession was practiced

He had a creative mind, trained to investigate facts, and suspicious of traditions with a courage to bring forth the new a judicial mind that judged so correctly the value of the new his genius brought forth that the things he wrought were recognized by science as enduring principles of surgery

He imparted to others his knowledge from a great storehouse by an irresistible enthusiasm, begotten by his appreciation of truth in a way that appealed to the mind, the conscience and the responsibility of his hearer and that made him the impelling teacher of his time.

His experiments were made in the laboratory in the dead house and in the animal operating room He thus proved theories by facts but never at the expense of those he served.

The impelling text of his life—in experiments in writing in the practice of his art, and in his burning utterances as a teacher—was Have uppermost in your mind the welfare of the individual who entrusts his life to your care

He worked and pleaded for higher standards. He was democratic in his methods. He condemned complacent entrenched interests as a bar to progress His life was a protest against ignorance and pretense He believed that most things worth while came from those not bound by tradition He encouraged the beginner and listened to the obscure.

He labored with more and more concentration of effort, as the wonders and possibilities of his task were revealed, trusting his strong body injured by abstinence and continued work to perform the almost superhuman task imposed upon it, and then the body broke and his life in the fullness of its power was sacrificed. Greater love hath no man than this, that a man lay down his life for his friends."

He loved God and expressed this love in his work for men and little children He was the devoted father the beloved husband the staunch friend, and the inspirer of all who came within his influence.

He was the human man developing through many years of self-discipline indefatigable work, untold sacrifice and desire of highest service into the super man—the high priest of the most exacting profession.

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THE EXTENDED OPERATION FOR CARCINOMA OF THE UTERUS¹

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FOUR years ago at the Baltimore meeting of this Society it was my privilege to take part in the symposium on uterine cancer. In that paper I said that while I believed in the radical abdominal operation greater experience had not made me any more confident that its primary or ultimate results would be favorable to the next patient operated upon. I have had no reason to change this opinion during the past four years. Unfortunately added experience has strengthened my belief that the extended operation for cancer of the uterus is an exceedingly dangerous operation all ways attended by a high primary mortality and that it is no operation for inexperienced hands. However it must be continually kept in mind that in spite of these defects today it is the only method unless it be the extended vaginal method which holds out to the patient with carcinoma of the uterus a reasonable hope of complete cure. I make this statement in advance of what will be revealed by the other essayists as to the results of radium or other methods of treatment. No one will be more glad to discard the radical abdominal method than will I if I can be shown that more patients can be ultimately cured by less dangerous methods.

To arrive at any just conclusions regarding the radical operation it is absolutely necessary that the primary and ultimate results be considered together. Every one who has performed the operation realizes how easy

it is to dodge the issue and perform what Clark has well called makeshift operations. What is easier than to avoid going beyond a mass in one or the other broad ligament in which the ureter is embedded and tying the uterine artery close to the uterus as in the ordinary panhysterectomy? Thus choosing the easiest way may save the operator a primary death but it just as surely dooms the patient to a continuance of the disease and ultimate death as did the old vaginal hysterectomy. Such an operation is not an extended operation for cancer of the uterus and should not be classified as such. If it be not excluded it will show in the final summing up for if the patients be kept track of they will be found to have died of so-called recurrences which in reality were no recurrences at all since the disease was not removed.

I would not be understood as asserting that an operator has not a perfect right to dodge the issue and save his patient primarily when he feels that a prolongation of the operation means but one thing—death. However I do insist that such operations should not be classed among the extended operations for carcinoma of the uterus for if so included they give a false conception of the primary mortality in fact it is not enough to state that such and such operations were radical. If they be radical it will be demonstrated in the ultimate results—the number of patients surviving five years or more. If these results be favorable then and only then will we

¹Read at the meeting of the American Gynecological Society, Washington, May 6, 1916.

be convinced that the operations were indeed radical.

Looked at in another way the burden of proof is upon the radical abdominal operator to show if his ultimate results are poor why he chose the abdominal in preference to the safer vaginal route as a palliative procedure, because it is a palliative method if it cannot be shown that quite a percentage of patients are alive and well after five years. We may or may not know at the completion of a certain radical operation whether it has accomplished its purpose. If macroscopic cancerous areas have been left behind it should be stated in any classification of radical operations for cancer of the uterus that in so many cases the operations were performed while in other cases, although the radical operation was attempted, it had to be abandoned on account of an extension of the disease not realized when the operation was begun.

It is different with microscopic areas of cancer. Here it is perfectly justifiable for the operator to conclude that he has performed the radical operation, if the principles of the technique such as ligation of the uterine arteries external to the ureters and removal of a long cuff of vaginal tissue below the cervical cancer be carried out. In reality excluding implantation metastases, an avoidable error of technique, every recurrence after a radical abdominal operation for cancer of the uterus, is evidence that the operator did not accomplish his purpose although he may have been justified in thinking at the time of the operation that he had.

PRIMARY RESULTS

As in the former paper I shall still include cases of cancer of the fundus with those of the cervix for both classes of cases have been subjected to the radical abdominal operation. However in order that the operative results may be compared with others, the primary and end results of carcinoma of the fundus and of the cervix have been considered separately. Since the 1912 meeting I have not employed the extended operation upon a single case of carcinoma of the fundus but have depended upon the ordinary panhysterectomy. Since 1912 there have been 14

cases of ordinary hysterectomy for carcinoma of the fundus with two primary deaths or a primary mortality of 14 per cent. There have been two recurrences.

This is a worse showing than in the former report where there were 11 radical operations for carcinoma of the fundus with one operative death or a primary mortality of 9 per cent, and only one recurrence in the remaining 10 cases. It confirms the position of Weibel who bases his conclusions upon 67 cases of carcinoma of the fundus from Wertheim's clinic. These cases were operated upon by different methods radical abdominal simple abdominal panhysterectomies, supravaginal amputations and vaginal hysterectomies. While the radical abdominal method was attended by the highest primary mortality, it also showed the highest percentage of ultimate recoveries, notwithstanding the fact that this method was employed in only the most advanced cases. In 31 cases the regional lymph glands were found to be involved five times or in 16 per cent.

The only recurrence in 10 cases of cancer of the fundus surviving the radical operation reported in my last series occurred in a patient where regional lymph-glands showed carcinoma. Just because our results are better in carcinoma of the fundus after ordinary panhysterectomy should not blind us to the fact that only by the very radical operation can the individual patient be given the best chance of a non-recurrence. There has been but a single recurrence in 10 patients surviving the radical abdominal operation for cancer of the fundus, although these patients are all beyond the five year limit. Hereafter I shall perform the radical operation upon all operable cancers of the fundus.

I had reason to think that greater experience with the operation under discussion carrying with it necessarily a reduction in the time required to complete the operative procedure would lower the primary mortality in my hands. This expectation was further justified by my results, since there were only 4 deaths in the last 37 cases in the last series or a mortality of 10.8 per cent. But my hopes were doomed to disappointment since the mortality has been increased from

22.5 per cent to 25.4 per cent there being 15 deaths in a total of 59 cases.

It is rather a thankless task to attempt to explain these latest deaths three of which resulted from shock and two from peritonitis. The same technique was employed as with the previous cases but with far worse results. I had thought it possible to judge with a fair degree of precision whether the cancerous process had advanced beyond the point where it was fairly safe to attempt the radical removal of the uterus especially if the final decision was reserved until after the abdomen was opened. But I judged incorrectly in these cases since the patients died of shock, the result of prolongation of the operation for a time sufficient to overcome the difficulties met with. The two patients dying from peritonitis should have been saved but were not in spite of all precautions to avoid sepsis.

It must be constantly borne in mind that every case of cancer of the uterus must be studied as an individual problem, so far as surgical treatment is concerned. First of all is the disease so far advanced as to preclude any hope that the patient can be cured by radical operation? Long ago it was determined that while much could be learned of the extent of the disease through careful vaginal and rectal palpation the final decision had to be made after the abdomen was opened. Only in this way is it possible to determine definitely the nature of induration to the sides of the uterus whether due to cancer or to pelvic inflammation.

If the parametria be involved by cancer well outside of the uterus it must be decided from the extent of the involvement and the other factors in the case whether to attempt the removal of the carcinoma radically or employ some palliative procedure. The other factors in the case are the age of the patient not in years always but the actual age as revealed by the condition of the kidneys, the heart and the blood vessels. Cancer patients do not stand prolonged operations well especially is this true when the uterus is the seat of the cancer. This is easily demonstrated when such patients are compared with women of the same age who have had to undergo prolonged operations for other con-

TABLE I—Radical Abdominal Operation for Cancer of the Uterus. Primary Mortality in 59 Cases. 48 Cases of Cancer of the Cervix, 11 Cases of Cancer of the Fundus. July 1912 to October 1915

Total number of cases	59
Total number of deaths	15
Total primary mortality	25.4%
Primary mortality—48 cervix cases	29.1%
Primary mortality—fundus cases	9.0%

TABLE II—Causes of Primary Deaths—15 Cases.

Shock	7
Shock and hemorrhag	2
Peritonitis	4
Embolus	2
Total	15

ditions in other words a patient with cancer of the uterus is a poor risk at best. Where the kidneys and vascular system are impaired it may be folly to subject her to such a serious operation because of the slight chance of her primary recovery. It may be far better for the patient to prolong her life as much as possible by palliative measures.

Using our best judgment we may and do make mistakes and attempt the impossible with the result that the patient does not recover primarily. But it is the height of folly in my opinion to speak continually as if the entire question of primary mortality after the radical operation for carcinoma of the uterus depended solely upon the extent of the disease. As a matter of fact that is only one of the factors in the problem the others being nearly if not just as important.

The responsibility of what the patient will decide rests after all with the surgeon. The victim of cancer of the uterus above every thing else wants to be cured, not only primarily but so that there will be no return of the disease. She may be willing to take a great risk if there be a fair chance of being cured but not one woman in fifty but will choose palliative measures and the prolongation of life rather than an almost hopeless operation so far as primary results are concerned. It is hardly fair for the surgeon to justify his course of taking large chances with the life of an individual cancer-of-the-uterus patient by saying that inasmuch as without an operation she is doomed to a horrible death consequently any operative procedure is justifiable. By so reasoning

TABLE III.—Cases of Cancer of the Uterus seen from May 9 to May 19 5

Cancer of the cervix	107
Cancer of fundus	7
	—
	114
Inoperable cases or refused operation	31
Radical abdominal operation	8
Panhysterectomy for cancer of fundus	4
Cautery—opening abdomen	3
Cautery—without opening abdomen	39
Total	24

he is not respecting the rights of the patient whose wishes not the surgeon's, should be paramount.

OPERABILITY

I am in no position to speak regarding operability of the cancer cases seen by me since May 1912 since I have been trying out the various methods of cauterization and have not used the radical operation for cancer of the fundus when it could have been employed. During the past four years I have seen in my university and private clinics 124 cases of cancer of the uterus, 107 cases of cancer of the cervix, and 17 cases of cancer of the fundus (Table III).

Unquestionably some of the cancer of the cervix cases could have been subjected to the radical operation, just how many I am unable to say but I was anxious to give the cautery treatment a fair trial not only in the so-called inoperable cases, far advanced cases, but those in the doubtful class as regards choice of operation. Again, 31 patients were so far advanced that nothing could be done or else they refused operation.

I was not fortunate in my selection of cases for the radical operation as shown by my results, and the discouragement that followed undoubtedly influenced me in the choice of cautery methods. However my experience with the cautery has not convinced me that it is in the slightest degree curative. On the contrary I believe that the method must be reserved for those cases of cancer of the uterus where palliative measures only are indicated or where it may be serviceable in preparing a cancerous cervix for radical removal.

I have already spoken of my experience with panhysterectomy for fundus carcinoma

TABLE IV.—End-Results of the Radical Abdominal Operation—5 Cases of Cancer of the Cervix and Fundus operated upon at least five years ago

Number of cases	5
Primary deaths	0
Number surviving	41
Number of recurrences	1
Died of intercurrent disease	
Patients alive and well five years or more after operation	7
Percentage of permanent cures of all cases operated upon (Wertheim's formula)	56 2%
Percentage of permanent cures of those surviving the operation (Wertheim's formula)	69 2%

and my determination to employ the radical operation in the future for this class of cases.

With the exception of these comparatively few cases where the radical operation might have been or was employed, the very large proportion of the cases of uterine cancer were inoperable from the standpoint of a possible cure. They were far advanced cases even more if I am any judge than the previous 125 cases which came under my observation. This is not very encouraging so far as the results of our campaign against cancer are concerned, but it furnishes convincing proof of the need of such a propaganda.

END-RESULTS

I am able at this time to report the end results of 41 cases of cancer of the cervix and fundus since the patients have all been operated upon five years. I am aware that percentages based upon such a small number of cases have only a relative value when compared with percentages of other operators based upon a large number of cases. As a matter of fact however we must employ the percentage method, if we are to compare results both large and small. Still it is best to keep in mind that percentages favorable or unfavorable, in a small series of cases do not tell the whole story.

In Table IV have been recorded the end results in 51 cases of cancer of the cervix and fundus combined, since the radical operation was performed for both classes of cancer. Naturally the end results will be better than when cancer of the cervix is considered alone, since there is less tendency for carcinoma situated in the fundus to recur. I might again emphasize the point that this is true if the radical operation has been employed, the

TABLE V—End-Results of the Radical Abdominal Operation for Cancer of the Cervix—40 Cases operated upon at least five years ago

Number of cases of cancer of the cervix	40
Primary deaths	9
Percentage of primary mortality	5
Number of patients with recurrences	11
Percentage of recurrences	36.4
Number dying of intercurrent disease	2
Number of patients alive and well at least five years after operation	18
Permanent cure of all patients operated upon by radical method (Wertheim's formula)	47.5%
Permanent cure of patients surviving the operation (Wertheim's formula)	62.0%

reverse being the case if ordinary panhysterectomy has been done

In the 41 patients surviving the radical operation there were 12 recurrences two died of intercurrent diseases one tuberculosis and the other heart disease There were 27 patients alive and well five years or more after the radical abdominal operation.

In order that there be no misunderstanding regarding the method of arriving at end results in this and the other tables it may be well to state that every patient was located and her condition ascertained for this report. In other words just because a patient with cancer of the uterus operated upon radically had passed the five year limit at the last report four years ago it was not assumed she was well today Her condition was ascertained by a letter from the patient herself or from her physician. Fortunately I am in a position to keep track of these cancer cases and have been able to secure the post-operative history of each patient.

Wertheim's rules for working out the statistics of the end results for cancer patients subjected to the radical operation have been followed in the tables because they are the simplest. All patients who die from intercurrent disease or who are lost track of must be subtracted from the total number of operations to ascertain the percentage of permanent cures in all cases operated upon To obtain the percentage of permanent cures of those surviving the operation the number of patients living five years or more after the operation must be divided by those surviving the primary operations after deducting those dying of intercurrent diseases and the number lost track of

TABLE VI—End-Results of the Radical Abdominal Operation for Cancer of the Fundus 11 Cases operated upon at least five years ago

Number of cases of cancer of the fundus	11
Primary deaths	1
Percentage of primary mortality	1
Number of patients with recurrences	1
Percentage of recurrences	9.0
Number of patients alive and well at least five years after operation	9

The end results as shown in Table IV are surprisingly good and very encouraging Five years or more after the operations 56.2 per cent of patients operated upon for cancer of the cervix and fundus are permanently cured while 60.2 per cent of those surviving the operations are well with no recurrence

In order to forestall objections that the results were due to the inclusion of fundus with cancer of the cervix cases the latter to the number of 40 the total number operated upon five years or more ago have been arranged in Table V The greatest interest centers around the number of patients alive and well after five years (18) Thus 47.3 per cent of the total number of patients with cancer of the cervix subjected to the radical abdominal method remain cured after five or more years while 62.0 per cent of those surviving the operation remain cured

But better than percentages better than anything else is the knowledge that 18 women out of 40 subjected to the radical operation for cancer of the cervix may be pronounced cured since they have passed the five year period without a recurrence This compensates in part for a high primary mortality since very few if any of these women would be alive today had other methods of cure been attempted

There have been no further recurrences in the 11 patients with cancer of the fundus mentioned in the last report, Table VI Of these one died from the operation and one from a recurrence one year after the operation The remaining 9 patients are alive and well from five to twelve years after the operations It has been considered inadvisable to figure the percentage of cures in such a small series of cases

The time elapsed since the radical operations has been recorded in Table VII Six patients have gone five years five patients six

TABLE VII.—Patients alive at Present Time without Recurrence.

Length of time since operation	Cervix	Fundus	Total
13 years.			
8 years.			
7 years.			
6 years.		1	
5 years.		1	
4 years.	6		3
3 years.	5		7
2 years.	8	4	5
1 year.	1		6
	1		—
			29

Number of cases five or more years after operation 29
 Number of cases less than five years after operation

years seven patients seven years, three patients eight years, two nine years, two twelve years, and one patient eleven and thirteen years respectively. While it is impossible to state positively there will be no further recurrences in this series of patients who have passed the five year limit, we have every reason to believe that such will be the case in most instances. However it is interesting to note that one of the recurrences and deaths occurred in a patient who had been apparently free from the disease for five and a half years after the radical operation for cancer of the cervix.

It may be stated that the patient mentioned in the last report as having had a recurrence in the vaginal cicatrix five months after the operation with no recurrence for two years subsequently died of the disease.

SUMMARY AND CONCLUSIONS

1. Further experience with the radical abdominal operation for cancer of the uterus confirms the belief that it is an exceedingly dangerous procedure and will always be attended by a high primary mortality.

2. Even if the percentage of operability of cases of cancer of the uterus markedly increases in this country and elsewhere there will always be border line cases attended by a high primary mortality.

3. This is true because it is not always possible even with the greatest care in examination of the patient prior to operation to estimate the extent of the disease.

4. Errors in judgment mean death from shock if the disease be too far advanced or failure to complete the radical removal of the cancerous uterus.

5. However in spite of a high primary mortality it is the only procedure with the possible exception of the extended vaginal operation which holds out any reasonable promise of a permanent cure.

6. Primary and end results of the radical operation for cancer of the uterus must be considered together in order to judge of the good accomplished in a given series of cases.

7. Unless the operations be radical the end results will be poor and if they be radical the primary mortality must be high.

8. If the end-results be poor the burden of proof is upon the radical abdominal operator to show why he did not choose a much safer palliative procedure.

9. Since 1912 experience with 14 ordinary panhysterectomies for cancer of the fundus shows worse primary and end results than in 11 cases previously reported where radical removal was performed.

10. This showing and the results following removal of carcinoma of the fundus by various methods in the Wertheim clinic as reported by Weibel lead to the conclusion that, because carcinoma of the fundus is more easily cured than when the cervix is involved, we are not justified in thinking it can be treated any less radically than carcinoma of the cervix.

11. The primary mortality in 59 cases of cancer of the cervix and fundus treated by the radical abdominal operation was 25.4 per cent.

12. The extent of the involvement in cancer of the uterus can only be determined definitely after the abdomen has been opened. If the parametria are not too much involved and the condition of the patient's kidneys, heart, and blood-vessels warrant a prolonged and depressing operation it is justifiable to attempt the radical operation.

13. During the past four years 124 cases of cancer of the uterus have been seen in the university and private clinics. The disease was so far advanced in 36 cases that operation was refused or nothing was done. The cautery

method was tried in 58 cases and proved valueless except as a palliative procedure.

14 In spite of attempts to educate the public regarding cancer the cases of cancer of the uterus seen during the past four years were more advanced than has formerly been the case.

15 The end results in 51 patients operated upon five or more years ago were most gratifying combining fundus and cervix cases 27 of the 51 patients were alive and well after five years or 52.2 per cent of all cases operated upon while 69.2 per cent of all those surviving the operations were alive after five years.

16 Of 40 cases of cancer of the cervix operated upon five years or more ago 18 of those surviving the operation are alive and well today. Thus 47.3 per cent of the total

number remain cured after five years while 62 per cent of those surviving the operation remain cured.

17 These percentages were obtained by Wertheim's formula where patient dying of intercurrent disease or those lost track of are subtracted from the total number of operative cases or from the number surviving.

18 The length of time elapsed since the operations upon the 18 patients who are alive and well vary from five up to thirteen years. There is every reason to think these patients are permanently cured although one patient did have a recurrence and died between five and six years after the radical operation.

19 In spite of the high primary mortality the end results in those surviving the operation encourage us to continue with the procedure in suitable cases.

X-RAY TREATMENT OF UTERINE HÆMORRHAGE¹

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INTRODUCTORY

THE X ray has been employed in gynecology for a sufficient length of time to allow the profession to form an accurate idea of the merits and demerits of this method of treatment. Nevertheless the conclusions arrived at vary greatly. Some authors particularly those of the Freiburg school and many roentgen therapists laud the X ray highly others especially certain gynecologists view the entire question of X ray therapy with suspicion and are inclined to class the method with the numerous transitory fads so common in contemporary medicine.

The present paper aims to defend X ray therapy from its friends. Properly employed in properly selected cases the treatment is invaluable and indispensable in gynecology. Used promiscuously by the uninitiated roentgenization is as dangerous as the surgeon's scalpel in the hands of the ignorant and the meddlesome.

The writer has used the X ray for a number of years. He has never given the exposures himself but has always referred the patients to the same roentgenologist. The selection of cases, the general directions (i.e. the effect to be attained such as the toning down of bleeding amenorrhœa etc.) the control of physical findings have remained in the writer's hands while technical questions have been left entirely to the judgment of the X ray specialist. No attempt to discuss the minutæ of technique will be made in this paper. Such information is readily accessible (1). Burns or other serious disturbances are practically unknown today if treatment is entrusted to competent hands.

MODUS OPERANDI OF THE RAYS

The X rays affect uterine hæmorrhage directly by their influence upon the ovaries (2) there is also a certain amount of evidence that uterine fibromyomata are influenced directly (3).

Ripe and partly ripening follicles are very susceptible to the rays. Primordial follicles on the other hand are extremely resistant even to massive and prolonged exposure, the ovaries of young women proving more resistant than those of older females. Whether this increased resistance is due purely to the greater number of primordial follicles in the young is not known.

As the menstrual function is dependent upon ovulation and the subsequent development of the corpus luteum (4) such uterine hemorrhages as result from normal or abnormal ovarian influences are necessarily affected by the inhibition of follicle ripening and ovulation. If all ova are destroyed, permanent amenorrhoea results if all ripe and ripening follicles are killed menstruation ceases, until some primordial follicles have had time to ripen and to rupture. Moreover considerable clinical evidence obtains that certain qualitative changes arise from roentgenization and persist after cessation of treatment, such as permanent diminution of menstrual bleeding. The physiological changes at the basis of this phenomenon are unknown.

Certain observation showing increase of connective tissue in fibromyomata which were subjected to raying have been interpreted as direct X ray effects (*loc cit*). Quite possibly however the fibrosis is an involution effect due to the withdrawal of ovarian stimuli from the tumors, comparable, though not identical, with the shrinkage of fibroids usually noted at the physiological menopause.

TECHNICAL

Fractional treatment implies exposure to the rays for 4 to 6 minutes of one or more large fields in the lower abdomen two to three times weekly over long periods of time. Such graduated dosage, though slow of effect, usually permits of accurate control of the degree of influence exerted upon the ovaries. It is therefore, especially recommended for cases where reduction of bleeding and not amenorrhoea is desired.

Intensive treatment according to the improved Freiburg technique permits of the use of enormous doses at each sitting (small

multiple fields filtration cross fire and lately also the Coolidge tube). By this means amenorrhoea may be achieved within a short period of treatment (9 to 18 weeks). This form of treatment is applicable to cases in which profuse bleeding must be controlled within a short period of time. Graduated effects are less readily obtained.

It is at times indicated to give one or two intensive treatments, to obtain control of the bleeding and then to continue with fractional doses in order not to produce amenorrhoea. An experienced technician can thus produce the desired effects almost at will.

APPLICABILITY

X ray therapy is applicable in

- 1 Functional menorrhagia and metrorrhagia of adolescents.
- 2 Functional menorrhagia and metrorrhagia during sexual maturity.
- 3 Functional menorrhagia and metrorrhagia preceding the climacterium.
- 4 Menorrhagia and metrorrhagia due to fibromyomata.

1 Adolescent hemorrhages. Prolonged and irregular hemorrhages between the ages of 13 and 18 years are not uncommon. The majority of cases respond to general tonic treatment, uterine styptica (ergot, styptol) and hygienic measures. A small number require one or more curettages. A still smaller number in whom the preceding measures fail to cure are relieved by serum injections calcium chloride by mouth or rectum, or transfusion. The few remaining cases, usually quite desperate because of their extreme anemia and debility after all measures have been tried in vain, are saved from hysterectomy or oophorectomy by X ray treatment. One or two intensive treatments are followed by fractional exposures until complete amenorrhoea is obtained. This effect is usually not attained for several months during which the bleeding occurs less and less frequently and in diminishing quantities. If vasomotor symptoms (flushes) develop the exposures should at once be diminished, as the dosage has been sufficient to produce amenorrhoea within a short time.

The amenorrhoea may persist for 8 to 12

months then scant and irregular (every 3 to 6 months) period appear finally normal menstruation is re-established. Permanent amenorrhœa is almost impossible to obtain in very young women.

Functional menorrhagia and metrorrhagia during sexual maturity. Occasionally cases are encountered in which purely functional hæmorrhages necessitate interference. The patients usually are in the early thirties and have had one or more children. The bleeding may take the form of either menorrhagia or metrorrhagia or both. Inflammation can be excluded both by the history (absence of venereal infection, normal puerperiums etc.) and by the physical findings. Usually the sole change noted is a moderate symmetrical increase in size of the entire uterus. Repeated curettages either produce only temporary palliation or are of no avail. The curettings regularly show endometrial hyperplasia or cystic endometrial changes. Formerly such cases after palliative measures had failed were treated by atmocauter or hysterectomy. Some of these patients desire more offspring.

When the condition is clear — i.e. absence of inflammatory lesions, curetting showing absence of carcinoma — X-ray treatment is applicable. If no more children are wanted amenorrhœa may be induced otherwise the bleeding should be toned down by fractional dosage; the more advanced the age of the patient the less exposures are needed. When the periods occur only at 4 to 6 months intervals and are scanty it is well to temporarily stop treatment in order not to run the risk of producing the menopause. Such patients may later conceive and bear healthy children.

3. *Functional preclimacteric menorrhagia and metrorrhagia.* In these cases carcinoma must always be excluded by one or more curettages (microscopical control). The curettings ordinarily resemble those obtained in Class 2. Unless the adnexal regions are free X-ray is also contra-indicated. Many of the cases clinically fall into the group of so-called fibroids, uterine myopathies, metritis, etc.

Other thing being equal the patient should

be given the choice between operation and X-ray. In cases in which vaginal hysterectomy promises to prove technically a safe operation should be preferred on the other hand in obese, emphysematous patient or those appearing to be poor operative risk, roentgen treatment is to be recommended as less dangerous than operation.

A few intensive treatments regularly produce permanent amenorrhœa. If this outcome is not obtained a mistake in diagnosis has been made (carcinoma, pedunculated submucous fibroid).

4. *Menorrhagia and metrorrhagia due to fibromyomata.* This class of cases has given rise to the largest amount of discussion. Kroenig and Gauss (6) claimed 100 per cent cures where the method was used and an applicability of 85 per cent. The writer on the other hand finds an applicability of only 5 per cent in his material (7). Between these widely divergent views all manner of opinions are noted.

To form a correct opinion a number of factors must be taken into consideration. The discovery of a symptomless fibroid *per se* does not indicate any interference. In the writer's experience only 45 per cent of fibroids require treatment especially if the patient is not informed of the presence of a tumor. Some member of the family may be made aware of the condition in order to safeguard the physician. Unless fibroids produce menorrhagia and metrorrhagia, pressure symptoms or enlargement of the abdomen, their presence is rarely noted and operation not considered.

Bleeding is the symptom most often complained of and most readily relieved by raying. Before X-ray treatment can be considered carcinoma must be excluded by exploratory curettage. The absence of cancer can be demonstrated only if the entire endometrial cavity is accessible to the curette. Uteri which contain tortuous cavities (submucous fibroids) ought therefore not be rayed.

Where pressure symptoms are severe or where large tumors are noted the writer excludes the use of the rays because several months of treatment must elapse before con-

siderable reduction in size of the mass and consequent relief can be looked for

Kroenig and Gauss consider the following conditions as contra indicating X ray treatment

1. Pedunculated submucous fibroid partly extruded from the cervix.
2. Gangrenous or suppurating fibroids.
3. Combination of fibroid and endometrial carcinoma.
4. Fibroids in which rapid growth, profuse metrorrhagia, and unsuccessful roentgen treatment makes the fear of sarcomatous degeneration likely
5. Fibroids causing acute incarceration of the bladder

Besides this they rarely recommend radiotherapy for patients below the age of 35 years as permanent amenorrhoea is difficult to obtain.

These contra indications are not sufficiently rigid. Abdominal diagnosis, including gynecological diagnosis, is notoriously uncertain. Surprises are constantly encountered. Even the experienced clinician will occasionally "slip up" on an apparently simple diagnosis, mistaking, for instance a cyst for a fibroid. In order to protect the patient, it is necessary to exclude all doubtful and complicated cases. What constitutes a doubtful or a complicated case remains a matter for the judgment and experience of the gynecologist to decide. The writer in a series of 419 unselected cases, which were admitted for operation to Dr Brettaner's service at Mt. Sinai Hospital, found 140 complicated cases (33 per cent) as the Table I will show

Of the 140 cases at least 74 (53 per cent) presented conditions absolutely contra indicating raying. Many of these conditions were not and could never be diagnosticated before operation.

Absolute contra indication to X ray treatments in the writer's opinion is present, if carcinoma or sarcoma are found or suspected if ovarian cysts or tumors are felt, if the uterine tumor is rapidly growing if the tumor is large (size of a 5 to 6 months pregnancy) if the palpatory findings are doubtful (suspicions of adnexal trouble, of rectal or sigmoid tumor or adhesions, etc)

TABLE I

<i>Malignancy</i>		
<i>Continued</i>		
Of sarcoma		
Of cyst		
<i>Sarcoma</i>		
Of sarcoma		
Of sarcoma		
Ovarian papillomatous cysts		
Proliferating ovarian follicles (non-malignant)		
Ductal cysts		
Non-malignant cysts		
Adnexal masses (uterine)		
Tubo-ovarian abscess		
Tubercular abscesses		
Pyosalpinx		
<i>Other conditions</i>		
Neurotic and psychomotor fibroids (in situ)		
Neurotic and psychomotor fibroids (in situ)		
Tubercular endometritis		
<i>Pregnancy</i>		
Myometrium sarcoma		
Myometrium sarcoma		
Cervical		
Extracervical		
Not specified		
Complications absolutely contra indicating rays		
Any serious complication		
Uterine cancer		
Cervical cancer		
Cervical cancer		
Complications not absolutely contra indicating rays		
Total complications	140	34
Cases indicated to rays		66
Cervical cancer		5.00 per cent
		8.50 per cent

Pedunculated or degenerating tumors, when recognizable are also contra indications. Urgent symptoms will necessarily preclude the use of the rays.

In clear cases of uncomplicated fibromyomata not excessive in size but causing symptoms, the question of raying versus operation may be considered. The decision rests with the patient, who should be enlightened in regard to the risk of operation (mortality 0.5 to 2 per cent) on the one hand, contrasted with the duration and expense of X ray treatment on the other

SOCIAL CONSIDERATIONS

X ray treatment can be given to the impecunious only in well equipped and well endowed institutions. In addition to the initial expense of the installation the operator's time the electricity consumed, and the replacement of tubes etc produce a formidable expense account. Fractional exposures (4 to 6 minutes) cost approximately \$3.00 each to cover expenses and may have to be continued 2 to 3 times a week for many months. Intensive exposure, sufficient to produce amenorrhoea and shrinkage of a fibroid in a

In six operations, 7 patients died. In 4 of them the cysts could not have been used (malignant of uterus and papilloma of ovary, fibroid and pregnancy with placental necrosis, fibroid) extending from cervix, septum, fixed increasing bladder, vesical reaction.

woman over 35 years of age will cost from one hundred to three hundred dollars at a minimum

INDICATIONS

Taking into consideration the absolute contra indications the danger of operation the expense and time involved the writer believes that about 5 per cent of fibroids (i.e. 10 per cent of those requiring interference) should be treated with the X ray. These indications are met in uncomplicated cases in which (1) operation is declined in which (2) operation is contra indicated because of extreme nervousness or psychical unrest, in which (3) operation is inadvisable because of serious heart disease renal or pulmonary lesions

SUMMARY

1 The roentgen ray produces amenorrhœa by destroying the ovarian follicular apparatus or oligorrhœa by partial destruction of follicles. The resulting menopause symptoms correspond in character and degree to those of the post-operative menopause

2 The choice lies between two methods of application (a) the fractional weak requiring prolonged use but readily controllable (b) the intensive massive more rapidly producing amenorrhœa.

3 Obstinate cases of hæmorrhage in adolescents can be cured. Only such cases as have resisted all other forms of therapy should be selected

4. Functional hæmorrhages during sexual maturity if conditions are unmistakable and curettage shows absence of carcinoma, may be relieved by producing oligorrhœa (with the possibility of subsequent pregnancy) or definitely cured by inducing the artificial menopause.

5 Preclimacteric functional hæmorrhages are readily cured by the production of the menopause. At this age malignancy must be even more carefully guarded against

6 Uterine fibroids may be slowly reduced by X ray treatment. All complicated cases should be excluded as otherwise serious or fatal mistakes may occur. In properly selected cases (5 to 10 per cent) the choice between operation and roentgen therapy may be left to the patient. In patients with serious heart lesions nephritis or pulmonary trouble or in the hyperneurotic preference should be given to the X rays

CONCLUSIONS

X ray in gynecology has proved an invaluable addition to our armamentarium. It enables the gynecologist to exert graded effects upon the ovary and thus control the menstrual cycle in degrees varying from slight inhibition to permanent destruction of function. It also causes fibroid tumors to diminish in size or to disappear

The main danger to be apprehended in X ray treatment is their application by error to malignant tumors. Such danger is minimized by excluding cases which present doubtful or complicated findings. Hence the treatment must always be controlled by the trained gynecologist because diagnostic accuracy is far more essential than if operative measures are contemplated

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PRECANCEROUS CHANGES IN THE UTERUS

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THE failure of scientific medicine to discover either a cause or a cure for cancer does not deny an assurance of a promising field in a more definite investigation of the local physiological and pathological changes which relate to the inception of the disease in individual organs.

Numerous conditions are recognized clinically as preceding or associated with cancer of the uterus in a variable percentage of cases. Trauma of the cervix during parturition resulting in a variable amount of ectropion is generally regarded as an important factor in the etiology of cancer of the uterine neck, but its histogenetic significance—whether related to the presence of scar tissue, to regenerative hypertrophy or in furnishing a larger field for atypical strife between two kinds of epithelium—is far from established. Chronic inflammatory diseases are becoming more definitely recognized as antecedents of neoplastic growth in the uterus, as well as in the breast and other organs.

Polese (1) for example, states that an endocervicitis preceded cancer of the cervix in 34 of his 48 cases and we find in the records of numerous observers how often such changes are related to the history of gonorrhea less often to that of tuberculosis. Syphilis is more definitely related to the inception of a cancerous disease in some regions of the body than any other common disease. In the uterus its relation is less well defined, but with our present resources in diagnosis a promising field for pathological research appears to be furnished in a closer study of those lesions designated as leucoplakia. Ewing (2) states that the cervical erosion is the most definitely established lesion known to precede cervical cancer and for corpus carcinoma, he says, the chief definite etiological factor is the association with myoma. Evidence of this frequent association of myoma with cancer of the uterus is furnished by numerous writers. Taussig (3) states that in a personal communication from the Mayo Clinic he learned that

myomata were present in 10 out of 40 cases of cancer of the corpus uteri in that clinic.

The observation of such causal relations however important they may be in the study of the occurrence of uterine cancer does not include its formal histogenesis the study of which becomes necessary in order to define the term precancerous.

Clinicians are generally agreed that there are no pathognomonic symptoms of uterine cancer until the tumor growth has become well established and usually not until its destructive capacity is grossly manifested. Atypical bleeding or discharge combined with other symptoms and a careful physical examination can only create a weak or strong suspicion of its early existence without the aid of a competent histological examination from which it is universally expected that a positive confirmation or denial of the clinical suspicions will be made. Failure to receive a positive diagnosis often creates in the mind of the clinician a suspicion of the incompetency of the pathologist or in the mind of the pathologist that he has not been furnished with the proper material. Each of these conditions may maintain but an analysis of the histological criteria upon which a positive diagnosis of a fully established cancerous growth is made shows that the pathologist, like the clinician is ordinarily not prepared to make such a diagnosis until some amount of destructive capacity is histologically manifested. In other words, cancer is an evolutionary process requiring time to show its actively destructive purpose. Ewing (2) says, It is not true that a pathological condition must be either cancer or not cancer. It may be neither the one nor the other. It may be in the process of becoming cancer. Using this author's analysis of the histological criteria in the diagnosis of cancer we have:

(1) Cellular overgrowth passing beyond that observed in other processes affecting the same tissue (2) atypical qualities of the cells metaplasia, anaplasia (3) loss of

polarity (4) heterotopia (5) desmoplastic properties (6) local invasive properties (7) metastases. Before there is an appreciable amount of heterotopia or invasive features however innumerable combinations of criteria may be seen each varying in quantity and quality. In some cases the amount of proliferation will make a striking feature in others the atypical quality of the cells—their size irregular shape peculiar staining qualities especially the larger size and hyperchromatism of their nuclei or their loss of polarity—will present such pictures that one feels reasonably certain that a malignant growth is in a developing stage. To many of such areas the term precancerous seems to be appropriately applied.

In the literature of uterine cancer we find much to support the idea that the evolution of a malignant growth can be observed from its beginning in definitely benign lesions to a stage in which it becomes a fully developed neoplasm. Schottlaender and Karmann (4) in their extensive monograph express the evolutionary character of cancer in the use of the terms immature moderately mature and fully mature according to the number and kind of morphological features that they present without regard to their histological type size or age. Contrary to the opinion of the majority of pathologists they believe that although there is no specific criterion by which the earliest beginnings of cancer-cells can be recognized it is possible to recognize an immature stage of cancer before its destructive growth is shown especially in the squamous cell form most of which appear in this stage. To those cases in which the morphology appears doubtful they use the term precancerous. While other writers are not so frank in the use of this term there is much evidence in their discussion of atypical changes of benign lesions in the uterus and their relation to the development of malignant growths to justify its application to a definite variety of intermediary changes.

Metaplasia. The transformation of cylindrical epithelium into the stratified variety has been produced experimentally in the stomach of lower animals by Fuetterer (5)

and Possner (6) and metaplasia of epithelium in the gall bladder stomach urethra and other organs has become established as a definite factor in the development of squamous-cell carcinoma in these organs. The uterus offers an especially fertile field for the study of the significance of this change in the evolution of malignant neoplasms. A certain amount of epithelial change and proliferation is shown by Klein (7) Mueller (8) and others to occur as a result of the physiological functions of menstruation and pregnancy and the factor of atrophic changes of the surface epithelium after the climacteric in the production of epidermization is discussed by Moencke (9) R. Meyer (10) in finding islands of stratified epithelium in the surface epithelium of the uterine body of a newborn infant and in subsequent observations has contributed much to the factor of developmental error. Friedlaender (11) observed small islands of stratified epithelium both on the surface and dipping in a few places into the glands of the lower segment of the uterine body of a child of five which he ascribed to hæmorrhagic effusions and exfoliation of particles of mucosa during a severe scarlatinal nephritis. The potential frequency of metaplastic change in the uterine mucosa is discussed by Werth (12) in the regenerative changes following curettage. Its frequency as presented by Zeller (13) in every form of chronic endometritis is questioned by subsequent writers but its occurrence in long existing chronic inflammation due to gonorrhœa tuberculosis and perhaps to syphilis is amply attested by numerous observers—Gebhard (14) von Franke (15) Ruge (16) Hengge (17) Oeri (18) Kaufmann (19) Sitzenfey (20) Schauenstein (21) Hitschmann (22) for an explanation of this process in the uterus offers the view that under pathological conditions the uterine epithelium may acquire the old embryonic capacity of that of the müllerian duct to form indifferently either cylindrical or stratified squamous epithelium in any part of its course and believes that, exclusive of polypi and other benign tumors its presence in the form of a true epidermization does not occur except as a malignant process. As a

histological criterion in the diagnosis of neoplastic changes its importance is related to its diversity of form and extent in those lesions under discussion.

Cervical erosion. The strongest argument against the histogenesis of carcinoma from this lesion has been the apparent infrequency which cancer has been observed clinically to follow such a common lesion. The best clinical record of such a sequence is that of Beckmann (23) who in a case, 37 years of age, that he had treated for an erosion over a period of five years finally saw a squamous cells carcinoma develop. In another 43 years of age, after two years duration of a lesion diagnosed as ectropion, an excision was made one and one-half years after which a carcinoma appeared. Several factors suggest themselves as contributing to the infrequency of such observations (1) The failure of the patient to consult a competent clinician before the tumor is well established (2) the length of time that such benign lesions probably exist before atypical changes begin preclude the continuous observation by a single clinician (3) the frequent cure of such lesions by minor surgical procedures (4) the orthodox conception of the pathologist that no intermediary stages can be recognized morphologically between benign and neoplastic change. The evidence, however in pathological literature has become sufficient to direct our attention to a closer study of the atypical changes which frequently occur in the course of healing of cervical erosions. Ruge and Velt (16) long ago expressed the opinion that erosions are not always a simple and unimportant process, and that an isolated erosion gland cannot always be differentiated from an isolated carcinoma gland without the surrounding tissues. Amann (24) refers to a number of cases in which the newly formed epithelium in a healing erosion spreads like a portio epithelioma. Winter (25) states that a true portio epithelioma not rarely forms from a healing erosion. Koblanck (26) can only express the differential character of a healing erosion and a portio carcinoma in the greater or less amount and regularity of epithelial metaplasia and the more or less atypical

qualities of the cells. Alfieri (27) has traced a carcinoma of the vaginal vault to a follicular erosion gland in a case of endocervicitis. Von Franke (15) in a case 43 years of age, found typical carcinomatous epithelium in the glands of a follicular erosion which he regarded as suspicious. Rubin (28) has recorded three cases of undoubted incipient cancer arising in a definite proliferation of atypical epithelium on the surface and in the glands of healing erosions, in which the diagnosis was made (1) from indistinct definition of cell outline, especially in the deeper layers (2) from the irregular large, hyperchromatic nuclei occasionally lumped together (3) no definite stratification of the layers and lack of alignment of the basal cells (4) marked nuclear granulation, as seen frequently in carcinoma in which hornification has not appeared. Mitoses and hornification, he regards as variable qualities. Schanenstein (21) gives a comprehensive description of the evolutionary features of cancer of the cervix in a report of four cases. His first case presenting an atypical proliferation of epithelium cells in a circumscribed area of the portio and along the lower part of the cervical canal, differed quantitatively from a healing erosion in the amount of cell proliferation along the surface and the extent to which the glands were filled with stratified epithelium and, qualitatively in the atypical character of the cells, in their loss of polarity in the deeper layers and the presence of numerous atypical mitoses. The other three cases, which appear to be definitely established carcinomata, differed from the first case in the amount of their atypical qualities and in the distinct heterotopia and slight stroma invasion. No macroscopic growth was found in any of the cases but in the three fully established growths it extended superficially along the entire cervical canal in one to the lower part of the corpus mucosa in another and to the corpus and vaginal wall in the third the vaginal epithelium being preserved over the growth. The morphology of the cells in the first case differed slightly more from those seen in atypical healing erosions than it did from the other three cases the latter differing from

each other chiefly in the amount of definition of cell outline. Under a high power the differentiation between the cells of the first and other cases he says could not be made. Schottlaender and Kermauner (4) made a similar observation regarding the differential morphology of such cases. In other words Schauenstein made the diagnosis of a definitely established cancer in three of his cases by a destructive action manifested by a distinct heterotopia and invasion of the glands not only by a direct proliferation through their mouths but also by bursting through their walls with which they came in contact. He believes that the first case was becoming a similar growth and only needed time to show its destructive action. K. Ulesko-Stroganowa (29) in a report of three cases describes the histological features of developing carcinomata on the base of healing erosions but her drawings do not confirm the descriptions and the rapid regression of the processes that she was able to demonstrate by an examination of the uteri which were removed four weeks later in two cases and of the cervix which was amputated two weeks later in the other makes it seem probable that in these cases there was only an exaggerated amount of cellular proliferation in the process of a healing erosion in two of the cases and a gonorrhoeal infection in the other. They show however the evolutionary character of the process. Cullen (30) to whom we are much indebted for his analysis of the histological criteria in the diagnosis of uterine cancer shows pictures of sections in the neighborhood of fully established tumors which he regards if taken by themselves as suspicious.¹ If no other evidence of growth existed how shall such changes be interpreted except as representing the developing stage of cancer?

Leucoplacia. The potential elements in these lesions of the tongue to develop cancer has long been recognized. Weir (31) 1875 was the first to describe leucoplacia of the female genitalia in the report of two cases occurring upon the vulva both of which developed cancer. Since then a few writers have described their occurrence on the vagina, portio, cervical and uterine canal which in

most instances after a long time have developed into cancer. Von Franque (15) made the first clinical observation of leucoplacia of the portio developing into a carcinoma observing the case as beginning in an erosion. His second case observed over a period of six years finally became a carcinoma. Berkeley and Bonny (3) consider leucoplacia of the vulva as the first stage of cancer. Sweeney (33) reports a case 3 years of age giving a history of syphilis and a positive Wassermann. It was also associated with a gonorrhoeal proctitis. No improvement followed the use of salvarsan and six months later a hysterectomy was done. Nothing of importance has been written regarding the etiology of these lesions in this region or their relation to syphilis except that in a few instances there has been a history of syphilis. So few cases of uterine leucoplacia have been recorded that it must be considered clinically a rare disease. It has appeared in the cases so far reported on the portio in association with similar and usually more extensive areas upon the vaginal walls or extending along the cervical and uterine canal to the fundus. The lesion appears as yellowish white slightly elevated patches of different sizes discrete or joined to each other by narrow bridges. The patches are adherent to the underlying tissue which bleeds if they are wiped away (von Franque, Sweeney). It has been described in a more extensive and diffuse form under the name of psoriasis or ichthyosis by von Rosthorn (34), von Franque (15), Zeller (13) and others. Its pathology as given by d'Hotman de Villiers and Thérèse (35), Jayle and Bender (36), von Rosthorn (34) and von Franque (15) consists of a marked metaplasia and thickening of the horny layer with increase in the keratohyaline granules of the stratum granulosum (Sweeney 33) resulting in complete epidermization and often showing considerable epithelial down growth. The more extensive growths which have existed a long time may present the picture of an adult acanthoma as for example the case of von Rosthorn (34) which is so regarded by Hitschmann (22) and others. This epidermization of the uterine mucosa relates specifically to the histogenesis of a

number of recorded cases of carcinoma, in which an extensive but superficial spread of the growth has occurred, covering a greater part of the mucosa of both the corpus and cervix—von Piering (37) Ruge and Veit (16) Benckiser (38) Hofmeier (39) Gebhard (14) Cellhorn (40) Kaufmann (19) Schauenstein (21). Some of these cases have shown acanthoma in the corpus and adenocanthoma in the cervix, or focal areas of acanthoma in an adenocarcinomatous structure for which an explanation may be reasonably found in the pre-existence of leucoplakia. Pfannenstiel (41) says every case of epidermization is not suspicious, but it is a precancerous stage in the same way that glandular hypertrophy and hyperplasia is to adenoma and adenocarcinoma.

Uterine polyps Numerous writers have directed attention to the frequency of sufficiently atypical epithelial metaplasia and overgrowth in uterine polyps—Klob (42) Billroth (43) Amann (24) Keldler (44) Winter (25) Kroemer (45) Bullus (46) Kuestner (47) Gessner (48)—to furnish evidence of their malignant tendency. Oertel's (18) description and drawings of the changes in both the surface and gland epithelium justify his conclusion that, although a diagnosis of a fully established neoplasm can not be made, they contain the potential elements of a developing cancer. He also reviews the literature of similar cases. J. Williams (49) describes a mucous polyp in which the down growth of epithelium into the glands is atypical enough to create the impression of a developing malignant growth. Opitz (50) directs attention to the frequency of epithelial metaplasia over that part of the polyp projecting into the vagina in which he sees a base for the development of a malignant change.

Submucous fibromyomata The importance of these tumors in the development of carcinoma, especially if they become pedunculated, relates primarily to the circulatory and nutritional changes they produce in the neighboring mucosa. We are indebted to Sitzenfrey (51) for a comprehensive description of the changes which occurred in two cases. In the first instance, the histology

of the curettings in a case of necrotic submucous fibroid showed an immature epidermization and a slight papillary proliferation of the surface epithelium and mouths of the gland ducts. In one area the cells became more atypical and heterotopic suggesting at two points a beginning invasion of the underlying stroma from which he regarded the case as strongly suspicious of a malignant formation. The case remained well however during 4½ years of observation. In the other case 50 years of age a submucous fibroid had been removed six years previously. A curettage for bleeding and discharge revealed an extensive metaplastic growth of surface epithelium and deep invasion of the gland ducts. Because of her age the presence of a necrotic polyp and other submucous myomata, a hysterectomy was performed. The uterine mucosa had a rigid white opaque appearance except near the insertion of a fibrous polyp where it appeared to be softer. Microscopically the mucosa was generally epidermized from the upper part of the cervix to the fundus as a result of a long-existing pyometra. Two layers could be distinguished in most of the areas a markedly hornified and a proliferating germinative qualitatively sufficiently atypical in a few areas both on the surface and in the glands to arouse suspicion of a malignant change but for some time it was regarded as a benign epidermization. Subsequently however von Franque discovered in a section of the anterior wall an area in which the atypical character of the cells the heterotopia and stroma invasion appeared to justify the diagnosis of carcinoma. In this area a figure is shown of atypical cell growth bursting through the membrana propria at the fundus of a gland, while the epithelium nearer the mouth of the gland appeared normal. In this connection Sitzenfrey's observation of another case 28 years of age is important. After a manual extraction of the placenta and a puerperal infection atypical bleeding occurred over a period of two years during which three curettings were performed. The first curettings showed a very marked overgrowth of both surface and gland epithelium in association with the changes of a diffuse chronic endometritis, but there



Fig. 1. Erosion. Chronic endometritis. Slight epithelial proliferation.



Fig. 2. Cervical dysplasia. Mucoid degeneration. Marked papillary growth.

were none of the features of a neoplasm. The subsequent curettages showed a marked regression of the process; in the last only a few places presenting a slight stratification of both surface and gland epithelium. Similar changes of benign epidermization were observed by Hengge (17) in two cases 44 and 49 years of age.

Glandular hypertrophy and hyperplasia. The glandular type of uterine cancer presents greater difficulties in the diagnosis of its incipient stage than the other forms because the preservation of the normal gland type persists in so many instances until the amount of neoplastic structure has reached bulky proportions. The frequency also of advanced grades of gland hypertrophy and hyperplasia in menstruation, pregnancy, and chronic inflammatory conditions adds to the difficulty making it at times quite insuperable. The claim of (Chard (14) that a malignant adenoma arises by a gradual transition from the ordinary form of hypertrophy and hyperplasia is not supported by the majority of pathologists. Baecker (15) however reports a case in which during a period of ten years the uterus was curetted 6 times. The

first 18 examinations showed ordinary hyperplasia, the nineteenth a benign adenoma, and the last a definite malignant neoplasm. Schottlaender and Kermauner (4) in an analysis of the histological criteria of their cases do not minimize the difficulties which the diagnosis of this type of growth presents in its inception, but in cases in which the change is limited even to the upper layers of the mucosa in which the only destructive sign is that of the lessened amount of interglandular stroma in which the eversion and inversions of the gland epithelium are atypically excessive and in which the staining quality of the cells, especially of the nuclei is altered, they offer a description which makes the diagnosis of a beginning neoplastic growth something more than a subjective feeling. Whenever minimal amounts of such morphological change occur in definitely focal areas of otherwise normal structure, especially if physiological and other pathological causes may be excluded, and when they occur at the age when malignant growth is most common, are we not justified in applying the term precancerous? Cullen has described the differential features of glandular carcinoma of the corpus uteri, and in a few of his case-illustrations and interpretations are given



Fig. 3 Epidermal metaplasia in cervical erosion. Pregnancy.



Fig. 4 Small mucous polypoid masses, epidermal metaplasia.

which seem pertinent to our subject. Atypical proliferation of both surface and gland epithelium are seen which he defines to be suspicious, or probable areas of beginning carcinoma; the definite diagnosis, however, depending upon the presence of a macroscopic tumor or the existence in other parts of a fully established growth. His case number 4508, page 527, appears to the writer to be very suggestive of a precancerous change. Two illustrations are given showing an atypical proliferation of epithelium, one on the surface and the other in a gland which created enough suspicion of malignancy in the author's mind to request the patient to travel 300 miles for a second curetting. Nothing was found at the subsequent operation performed three months after the first, and the patient's condition was reported to be well three years afterward. Cullen's conclusion from the sequence of events that the patient did not have a fully established

growth is undoubtedly correct but to the writer it seems reasonable to make an interpretation other than that such a proliferation was simply part of an acute endometritis. The argument that solid masses of cellular proliferation such as are shown in one of the illustrations are not characteristic of early adenocarcinoma of the uterus is true but from the literature which the writer has given it seems not at all unlikely that both the surface and intraglandular proliferation may express the presence of focal areas of metaplasia perhaps in the process of becoming leucoplakia as a result of a gonorrhea of which the patient's history was said to be suspicious. If so the case may be reasonably considered precancerous.

As an additional contribution to the literature of the subject of precancerous change the writer offers the following cases which he has collected from the uterine material in the Pathological Laboratory of the Cornell University Medical College.



Fig. 2. Cervical polypoid papillary degenerative proliferation.



Fig. 3. Papillary neovasculation. Mature glandular proliferation.

CASE 1. Papillary rosion. Chronic cervicitis. Slight epithelial proliferation (Fig. 1).

It was submitted to the laboratory for diagnosis. The specimen has an increased chronic interstitial inflammation. There are numerous foci of epithelial protrusion into the area of the mucosa, which then enter into papillary tufts covered in the surface by a thin layer of epithelium but largely by the epithelium on the tips. One or two places have even given place to epithelial proliferation in the surface layer. There are numerous sections of epithelium within the tufts, but they are not numerous enough to make the diagnosis of beginning neoplasia.

CASE 2. Cervical polyp. Marked papillary overgrowth (Fig. 2). Shallow ulcers with laboratorial diagnosis. The uterine cavity is filled with epithelial proliferation in the area shown in Fig. 2. The epithelium is scanty and there is no appearance of any glandular structures. Mucoid degeneration with ill-defined tufts. The typical polypoid appearance appears to be in case 1 but it is not the case in this situation, a tumor (Fig. 3).

CASE 3. Epithelial metaplasia in a cervical lesion (Fig. 4).

Age 35. Pregnant in third month. At 11 weeks gestation the uterine cavity is empty. A

section of the polypoid mass is removed for diagnosis. The uterine cavity is covered by a thin layer of stratified epithelium which is not more than three or four cell layers thick. The most superficial of which appear to be cylindrical. In the proximal part of the mass, the glandular and immediately beneath the uterine epithelium is a cluster of glands filled with epithelial cells that are not atypical enough to be designated cancerous, but more so than is usually seen in a simple erosion. The upper portion of the amount of metaplasia in these glands is compared with that on the surface is also an atypical change. It has been designated as a precancerous change and the clinician has been requested to make an early diagnostic excision in a month.

CASE 4. Small mucous polyp. Cervical rosion. Excess of epidermoid metaplasia (Fig. 4).

Clinical history. Age 40. Mother of 6 children last 3 years ago. Menstruation scanty. Discharge for some time lately tinged with blood. Cervix was lightly ectropic and just within the external os there was a very small polyp which was excised for diagnosis.

The histological examination shows normal cylindrical epithelium hanging abruptly into a slightly thickened stratum basale which presents

small atypical papillary growth with thick glands in this area. Normal glands are seen in Fig.



Fig. 7. Patches of cervical leucoplakia.

4 there are numerous papillary outgrowths mostly covered with normal cylindrical epithelium beneath which are numerous and irregular metaplastic glands, mingling properly with similar metaplastic outgrowths from an underlying hypertrophic gland. There is no trace of hornification, but there is proliferation of the deeper layers and grossly irregular outline of the glands. The quality of the cells, however, is mostly benign and the process appears to be a very atypical metaplastic change to which we would apply the term precancerous. The patient refused amputation of the cervix, but there is every reason to believe that she is well, one year after the examination was made.

CASE 5. Cervical polyp. Extensive papillary and epidermoid proliferation (Fig. 5).

Clinical history not available. The papillary structure is excessive, showing numerous areas with little if anystroma between contiguous papillae with apparently normal cells. In the field shown in Fig. 5 there is so much metaplasia and overgrowth that it is difficult to say that carcinoma has not already become established. There are traces of heterotopia and stroma invasion.

CASE 6. Papillary endocervicitis. Miniature islands of epidermization (Fig. 6).

Slide submitted to the laboratory for diagnosis. Clinical history and gross material not available. The section shows the sign of chronic inflammation



Fig. 8. Downgrowth from completely epidermized surface.

and slight papillary formation. The remaining of cylindrical cells is generally well preserved. In one or two areas there are very small islands of epidermization which possess the miniature form of leucoplakia. In another section there is a larger island showing the same change. The interval between these sections relates to the changes seen in Cases 7 and 8.

CASE 7. Leucoplakia of the cervix. Papillary proliferation. History of syphilis (Figs. 7 and 8).

Clinical history. Age 50, married 7 years, 6 children, 5 miscarriages. Typhoid fever at 4 years of age, scarlet fever at 4, measles at 40. At 4 years of age, lesions which appeared on both legs persisted until he was 6. When 30 was in hospital for 6 weeks with double otitis media and a disease of the throat which resulted in perforation of the palate. From an investigation made at that time it was learned that both her father and mother had syphilis before she was born. A brother also had the disease. She was treated for syphilis periodically for some time thereafter. At 33 she married and two children died. Menstruation as girl was painful and she had leucorrhoea. It has always been profuse and during the past five years irregular. The last period began seven weeks before admission to the hospital and continued for six weeks. She has recently had attacks of vertigo and pains in the legs.

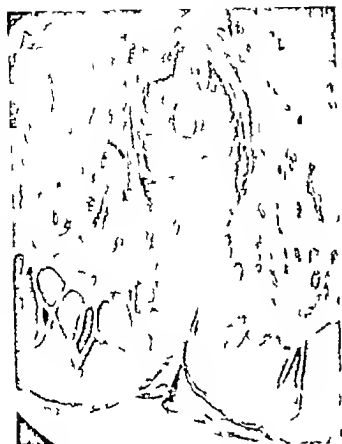


Fig. 7. Histological section of the cervix showing a large, retroverted uterus with a thickened endometrium and a small intramural fibroid. The cervix is dilated and contains some areas of atrophic endometrium. A hysterectomy was performed.

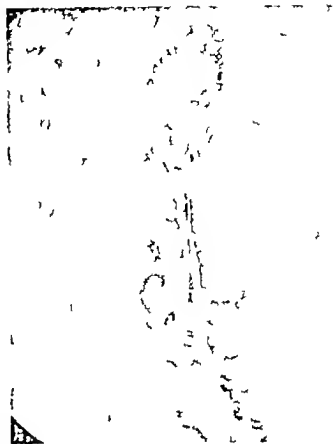


Fig. 8. Metaplasia and proliferation in deep solid cervical glands resembling initial inflammation.

especially in the length of the foot so that it has been difficult.

First examination. There is a scar at the site of the perforation of the placenta and there are scars of old lesions in the neck posteriorly in the internal os. The site of the previous ulcer of the leg. There is a paralysis in the right leg. There are no symptoms. The Wassermann test is positive. The uterus is large and retroverted. There is no thickening of the appendages. The cervix is dilated and contains some areas of atrophic endometrium. A hysterectomy was performed. Cross section. The uterus is much enlarged but with the exception of a small intramural fibroid about the cervix there is no apparent tumor growth. The normal rugae of the cervical mucosa have entirely disappeared and the surface is covered with whitish yellow, lightly elevated patches which are millimetric in the region of the internal os. The mucosa of the cervix appears to be thin and on gill.

Histology. Section of the cervical canal shows a marked thickening of the stratified epithelium with little tendency to elongate with overlying a few dilated glands and broken by the openings of a few lightly hyperplastic glands. The chief features are shown in Fig. 7 in which numerous islands of epithelial cells are seen lying on and within

the papillary meshwork. The small papillae joining each other in such a way as to make apparent a number of newly formed glands. At intervals normal glands open upon the meshwork between which are small areas of epithelialized glands appearing like epithelial nests. In another area shown in Fig. 8 there is a slow growth from a more completely epithelialized surface representing the metaplastic transformation of a gland which because of the direction of the section resembles carcinoma nests. The mucosa of the cervix shows only the changes of an atrophic endometritis. Some sections of the troma show marked evidence of a chronic myositis. There is a focal overgrowth of small muscle cells with hyperchromatic nuclei distended lymph channels and numerous new blood vessels with thickened walls. We have then in a case giving a history of syphilis and other severe infections and presenting clinically strong suspicions of a cancer of the cervix typical patches of leucoplakia extending along the entire course of the cervical canal and grouped within areas of a papillary proliferation of epithelium. In other words there are the prototypes of two forms of malignant change — epidermoid carcinoma and papillary adenocarcinoma of the cervix.

Case 8. Epithelialization of the cervical mucosa. Leucoplakia. Cervical polyp. Tubo-ovarian abscess. (Fig. 9)



Fig. 1. Precancerous gland hyperplasia of corpus.

Clinical history. Age 33 single, no children. Had complained of profuse menstruation, discharge and pelvic pain. No history of leukoplakia. Examination showed large hard cervix which was markedly eroded. A clinical diagnosis of chronic endocervicitis with erosion was made and the cervix was cauterized. Diseased appendages were subsequently discovered and an operation revealed tubo-ovarian abscess on one side and pyosalpinx on the other. The gross material is not available.

Histology. A section of the cervix shows the cervical mucus transformed into a thickened layer of stratified squamous epithelium with marked tendency in areas to keratinization and well marked papillary downgrowth. In the field shown in Fig. 9 the metaplasia has extended to gland around the lower end of which is a thin layer of round-cell infiltration. The stroma shows marked hyperplastic change with numerous blood-vessels and perivascular areas of fibrosis. The cells of the epithelial layers are well differentiated but the basal cells show slight proliferation in some places. If similar process covered the entire mucus of the corpus, it would present a picture not unlike that in our Rosthorn (34) case of ichthyosis, which Hirschmann (35) and others have said is a metastasizing carcinoma.

Case 9. Isolated cervical gland showing metaplasia and proliferation. One gland in interstitial inflammation (Fig. 10).

No information is available regarding the clinical history or gross material. The gland appears to be isolated from the deep structure of the cervix and partly transformed into stratified epithelium which gives some evidence of proliferation. The quality of the cells is slightly typical. In other sections there is normal stratified surface epithelium overlying



Fig. 2. Advanced precancerous hyperplasia of corpus.

(Fig. 11) three superficial normal glands and total 14. A variation in the proportion of the glands in this gland is impossible to make but there is undoubtedly relation between the glandular changes and the peripheral interstitial inflammation. As prototype of tumor growth, think of those cases in which malignant growth begins directly as basal nodule within stroma of the cervix.

(Fig. 12) Precancerous gland hyperplasia of corpus (Clinical history suggestive of cancer) (Fig. 13).

Clinical history. Age 55. Menopause entered seven years previously. There had been continuous bleeding for eight weeks. Has been cured three times the last one week ago after which the bleeding ceased and has not yet recurred. The enlarged size of the uterus, bowels, has not yet diminished. The material removed by the first curettage is said by competent pathologists to present the same picture as that from the last operation which was sent to the laboratory for diagnosis.

Histology. There is advanced glandular hyperplasia and hyperplasia throughout all of the areas. The stroma, however, is abundant except in few places where the glands have become dilated into small cystic spaces lined by one layer of low cuboidal epithelium. In the area shown in Fig. 14

although there is no appreciable difference in the amount of interstitial stroma the glands in stroma



Fig. 3 Atypical proliferation in the endometrium



Fig. 4 Benign endometrial tumor

ture is essentially altered. The epithelial outgrowths and ingrowths are more prominent feature. The all show a tendency to be as much an irregular proliferation of the cells as the normal layer and the nuclei are hyperchromatic. Now with the retraction of breaking through the membranous propria. This case illustrates the immediate practical side of the problem. With such a histological picture the decision relative to therapy should be made by a competent clinician provided he has a proper appreciation of the histologist's interpretation of the expression precancerous. In this case a delay in radical surgical measures is planned.

CASE 1. Advanced precancerous hyperplasia of the endometrium. (Fig. 12)

Age 3. Atypical bleeding. The uterus is much larger than normal presumably because of the presence of an intramural fibroid.

Histology. The uterine material is decidedly different from that of Case 10 but it is doubtful if the hyperplasia is growth other than the fibroid will be found. The glandular hyperplasia is considerably more advanced but numerous of the stroma is uncharacteristically abundant to exclude a tumor process. In the area shown in Fig. 13 the glandular tissue together with the cell material in the lumen is thicker than that of Case 10. Their histological qualities are chiefly of the type of the hyperplasia.

Qualities of the cell protoplasm. Ingrowth and ingrowths are numerous and there appear to be a tendency to form more than one layer. Hyperplasia is faintly expressed. Because of the presence of the fibroid the decision in regard to the correct therapeutic procedure is easier to make. Unfortunately we have not yet received the gross specimen because the patient has thus far refused a radical operation.

CASE 2. Atypical epithelial proliferation. Acute endometritis (Fig. 13)

Clinical history. Age 28. One child six years previously. Several attempts have been made during the past year to hasten delayed menstrual periods. Atypical bleeding for several weeks. Curettage was performed.

Histology. The changes are mostly those of an acute endometritis. In a few areas however there are traces of epithelial overgrowth in which the normal quality of the cells is altered showing a few large irregular and hyperchromatic nuclei clumped not unlike that seen in giant cell formation (Fig. 14). From the benign character of the clinical history and the presence of an acute endometritis we are unable to attach much serious importance to these focal changes.

CASE 3. Benign endometrial tumor (Fig. 14)

The clinical history. A gross microscopical

available. The section is that of a cervix with normal surface epithelium and a few superficial erosion follicles. In Fig. 4 there is bow gland hypertrophy and hyperplasia of sufficient amount to closely approach that found in a tumor growth. It is situated deeply within the stroma without signs of inflammatory change. The lining cells everywhere preserve the normal type of mucous cell. It seems not improbable that such process is a prototype of that infrequent form of adenoma of the cervix, in which the mucous cells preserve their normal type after the glandular growth has reached bulky proportions and become clinically malignant.

SUMMARY

It seems to the writer that the evidence in the literature and the material which he has presented justifies the following comments.

1. As the positive identification of a malignant neoplasm can not be made histologically until definite destructive capacity is recognized it seems reasonable to relate more definitely the other histological criteria of cancer to the developmental stage of its growth, the closeness of the relation in a specific case depending upon the quality and quantity of such criteria as may be present.

2. If so we find in the study of uterine pathology numerous morphological alterations of epithelial growth which differ but little from the regenerative activity of benign lesions but which after a longer or shorter time show features that are differentiated with difficulty from the alterations we know typify malignant neoplasm.

3. The strongest support of this assumption is derived from the reproduction of types which are seen in the different stages of their progress. We find the atypical features of a healing erosion for example determined by the original type of the primary erosion—simple papillary follicular and we find the atypical types again reproduced in the different types of fully established uterine cancer. In the writer's cases there are atypical healing erosions which are prototypes of either an epidermoid cancer or a papillary adenocarcinoma. There are leucoplasias which are prototypes of adult acanthomata. There are glandular hyperplasias which lead to adenoma or adenocarcinoma. Finally there are focal areas of leucoplasia combined

with adenomatous hyperplasia which may well furnish an origin for tumors designated as adeno-acanthomata. In short, for each type of fully developed carcinoma there is a corresponding type of benign and intermediary change.

4. Clinical observation increasingly confirms the sequence of definite benign lesions in the uterus and cancer but its evidence is thus far too scanty either to confirm or deny their histogenetic relations. In order to work out this problem a closer co-operation is required between the clinician and the pathologist with the idea constantly in mind that the morphological features of intermediary stages may exist. It is no argument against such an assumption because no tumor process presents or follows in a given case. The evidence is already sufficient to show that a fully established cancer may exist for a certain time without giving gross evidence of its presence and numerous cases are recorded in which the curette has completely removed the disease.

5. There is no reason to assume that precancerous changes without treatment always develop into malignant growths. We know different types of fully established tumors have a different capacity to grow and destroy rapidly or slowly and it does not seem reasonable to assume that a developing cancer has the same momentum that a fully established tumor possesses.

6. In the study of beginning cancer of the uterus Sitzsney (20) Schauenstein (21) Schottlaender Kernhauser (4) and Pronai (53) direct attention to the important observation that a certain type of early cancer spreads superficially over wide areas before showing marked invasive feature. It has occurred to the writer that such a mode of growth may account in some measure for the widespread extent of the process before it receives the attention of the clinician.

7. From a practical standpoint the decision regarding the proper therapeutic procedure in these cases should be assumed by a competent clinician.

The writer desires to express an appreciation of his indebtedness to Professor James Ewing for numerous criticisms and suggestions and

also to thank Drs L. Esperance Caturani and Mallett for much of the clinical and pathological material

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A DETAILED STUDY OF THE PATHOLOGICAL CAUSES OF STERILITY WITH THE END-RESULTS¹

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PROBABLY no question is of such sociological significance to the gynecologist as that of sterility. Homes are wrecked lives are sacrificed and fortunes lost, all because of the inability of a woman to conceive or to successfully bring forth the fruits of her conception. Certainly no subject taxes the resourcefulness and ingenuity of the gynecologist more. Do what we will many women from one cause or another are destined to remain fruitless.

It would seem from an extensive study of

our case records that the number of sterile women is increasing at least an increasing number is applying for relief. Yet a large majority of those who apply present such gross lesions that little or nothing can be done to help them.

We may define sterility as the inability on the part of the woman to produce a living child. This inclusive definition is propounded so that we may include in this discussion the part which syphilis plays in the etiology. Sterility may further be divided into the so-

called primary sterility where the woman has never been pregnant, and the secondary type where she has borne a child or has had a miscarriage and remains sterile thereafter. In this study which is a personal review of 798 case histories of patients from the writer's private practice we will attempt *first* to analyze the many etiological factors which have entered into the causation of this symptom *second* to discuss the treatment of the individual case based upon an etiological diagnosis, and *finally* to summarize our end results, in the hope that this contribution may add something to this already overwritten but unsolved subject.

It must be primarily admitted that conception depends *first* upon the perfect consummation of the sexual act *second* on the proper fecundation of the ovum, and *third* on the proper nourishment of the impregnated ovum during its growth and development after its final location in the decidual bed. It is thus apparent that certain conditions are essential for conception. Findley has tersely summarized these as follows:

- 1 The deposit of semen containing active living spermatozoa in the upper portion of the vagina.

- 2 The passage of the healthy spermatozoa to the ovule through the cervix into the cavity of the uterus and into the tube.

- 3 A healthy ovum which has unhindered transit from the ovary and after impregnation, through the tube into the uterine cavity.

- 4 A decidual bed for the impregnated ovum to find a permanent resting place in the endometrium until the period of viability.

These conditions entail a healthy male producing a healthy active, well-developed long ciliated spermatozoid capable of rapid movement through the semen. Furthermore, the seminal discharge should be free from infective bacteria. For these reasons, the husband of each woman in this series has been subjected to a most exacting examination by a competent urologist. This examination has not only included an investigation as to the potency but as to the presence of past or present infective disease. The passage of the spermatozoon through

the cervix is dependent upon the activity of the particular spermatozoon and the amount character and reaction of the glandular secretion from the cervix. Acids in very weak dilutions are destructive to the spermatozoa and thick muco-pus acts as an almost insurmountable barrier to the progress of the male element.

Proper ovulation depends on the efficiency of the individual ovary. This implies a healthy egg bearing area and the free delivery of the ovule through the ovarian tunic. Consequently conditions which have resulted in a thickening of the tunic militate against conception. Chronic inflammatory changes, prolonged acute infection, fatty degeneration, tumors, adhesions and senile atrophy all impair the egg-producing quality of the ovary as well as tend to thicken the tunic to such an extent that ovular rupture may be prevented.

The proper transit of the ovum from the ovary to the uterus requires a healthy patent fallopian tube. Fecundation is supposed to take place at the outer end of the fallopian tube, from whence the impregnated ovum is propelled along the course of the tube into the uterus where the endometrium has been prepared by the development of a decidua for its reception and permanent nutrition. Hence conditions which interfere with this free transit may be accepted as causes of sterility. While a tube may not be patent to an impregnated ovum, its lumen may still be sufficient to allow the passage of the spermatozoon and impregnation of the ovule in its distal portion. This is shown by the great frequency of tubal pregnancies, occurring after long periods of sterility which are due to the results of chronic inflammatory disease.

The conditions of the tube which may impair the transmission of the impregnated ovum are either congenital or acquired. Of the former we may mention tortions, constrictions, angulations, and diverticula, while acquired lesions are commonly the result of inflammatory processes, which either occlude the lumen or destroy the epithelial lining of the tube or produce peritubal adhesions which distort the tube and thus prevent the passage of the ovum.

On arriving in the uterus the impregnated ovum locates in the decidual bed prepared for its nourishment which usually is situated just below the uterine ostium of the tube on the anterior or posterior wall of the uterus and unless the endometrium has been the seat of disease the ovum develops at the site of its primary implantation. Syphilis of the endometrium may prevent implantation of the ovum or cause its early discharge from the uterus. Circulatory derangements which produce hyperplastic and fungoid changes in the endometrium contribute largely to the unrest of the ovum. These circulatory changes may be produced by displacements, fibroid tumors, sexual excesses, lacerations and subinvolutions and result in an endometrial hyperplasia. Such conditions change the character of the uterine secretion producing toxic discharges from the involved surfaces of both the body and cervix which may cause the death of the sperm cell and thus produce another factor which is antagonistic to the occurrence of pregnancy.

The foregoing may therefore be considered the essential factors in the fecundation and the development of the impregnated ovum. Hence it may be deduced that where any of these elements are defective sterility may result. McDonald claims that there is primarily a congenital anomaly (hypoplasia of the genitalia) in the etiology of all cases of primary sterility. This however has not been the experience of the writer who has found that a preceding salpingitis has been responsible for more cases of sterility than all other causes combined.

It is commonly admitted that the general health of the woman has much to do with the occurrence of pregnancy. It is also known that men become less potent from the strain of overwork and that nervous excitability decreases the individual's potency. Women who have become rapidly obese are not infrequently sterile. Hence it will be seen that each individual case must be analyzed as to its etiology before any form of treatment can be considered and this analysis must include an investigation of both contracting parties for in our opinion the operative treatment of a woman for sterility alone

without the actual inspection of her husband's spermatozoa is not only unjustifiable but frequently does actual harm to that woman and brings discredit to gynecology. Reynolds in a recent paper presented before the obstetric section of the American Medical Association offers the following working hypothesis for determining the cause of sterility in the individual case:

1. He states that when the spermatozoa are abundant in number, normal in form and appearance, furnished with long cilia and capable of rapid movement through the semen, the male may be considered as *satis factorily potent*. While this is essentially true, our experience has taught us that the presence of infective bacteria in the semen or prostatic discharge, even if the spermatozoa are well formed, will often vitiate their potency because of the effect produced by these bacteria on the generative organs of the receiving female.

When the normal spermatozoa are killed or lose their vitality overrapidly in the secretions of the individual woman, the chemico-physiologic character of her secretions furnishes an effective cause for the sterility.

These alterations in the secretions of the woman which are fatal to the spermatozoa may be located in the vagina, in the cervix, in the body of the uterus or in one or both tubes. Any of these secretions may exist with normal secretions above it but alterations in the secreting surface in any of these localities usually vitiates all the secretions below it owing to the admixture which takes place for acids in very weak dilution are rapidly fatal to the spermatozoa. Finally when the spermatozoa are observed to penetrate without apparent loss of vitality to the fundus of the uterus and to survive there for a normal length of time, *deficient quality of the ova* may be considered as the probable cause of the sterility. Lade estimates that there are 2,500,000 spermatozooids in a single ejaculation and it is stated that the spermatozoa will not live longer than twelve hours in the acid secretion of the vagina, yet in the normal secretion of the uterus and the tubes they will commonly retain their activity and vitality for 12 or eight days. In

Leopold's case the woman had not had sexual intercourse for thirty seven days prior to the abdominal section which he performed when active living spermatozoa were found in large numbers in the fimbriated end of the tube. We have frequently noted during microscopic examination of the withdrawn semen the effect of the mucopurulent secretion from an infected cervix on the activity and life history of the spermatozoa. They may be seen struggling around trying to free themselves from the sticky mucus and finally exhausted from their struggle to push on die. Hence we feel that the tight fitting plug of mucus in endocervicitis is a real obstacle to the advance of the spermatozoid. Lescapasse claims that the secretions in different women dissolve the spermatozoa of different men and thus produce a sort of immunity action. This is probably the explanation of why certain healthy women fail to conceive by apparently healthy males and then upon re marriage promptly conceive.

Huehner has checked up the progress of the spermatozoid by microscopic examination of the spermatozoa *in situ* in the genitals of the woman by taking the woman's secretions at different locations at definite periods after the intercourse and in this way has determined the action of the secretions and the comparative vitality of the spermatozoa at different locations in the genital tract. This has in his experiments given a direct index of the chemicophysiologic action of the individual secretions and affords valuable evidence as to the possibility of impregnation in a particular case.

While acute ante flexion of the cervix, in fraccervical hypertrophy and pronounced retroversion of the uterus act as causes of sterility by mechanically removing the cervix from its position in the seminal lake they will not prevent conception unless there is some change in the chemicophysiologic action of the cervicovaginal discharge.

Aside from these factors already referred to certain clinical observations are worthy of mention as they contribute materially in determining the value of treatment. The average interval between marriage and the birth of the first child is seventeen months and

the probability of impregnation decreases thereafter. Only 25 per cent of women bear their first child after four years. Therefore a union may be regarded as presumptively sterile when after three years of married life no child has been born. Hypoplasia of the genitalia is a common cause of sterility. In infantilism may be found in the uterus alone or in the uterus, vagina, and external genitalia, or associated with other evidence of congenital hypoplasia as loose right kidney, just minor or funnel pelvis, long back, cannonball abdomen, intestinal ptosis, small head, weak ligaments, high roofed mouth under weight and unstable nervous system. When the uterus is *infantile* it retains the shape and appearance of the uterus of the girl before puberty. It may take one of two types it may be long and slender with a small fundus, a long isthmus and a long conical cervix, or it may be shorter with a long isthmus, small fundus and a small cervix, with most of the cervix placed above the insertion of the vagina and but little projecting into it. The first type has usually a marked ante flexion while the second is frequently associated with marked narrowing of the vagina in its upper part. The infantile uterus usually has a long isthmus with the plicae palmatae of the mucosa of the isthmus well marked and longitudinal instead of being thin and horizontal or twisted. The vagina is commonly involved with infantilism of the uterus. This takes the form of a narrowing particularly of the upper part of the vagina, thus obliterating the seminal lake consequently instead of being balloon or pear shaped with the largest end upward, the vagina is tubular or sausage-shaped. As a result of this the semen is not retained where it should be after coitus but is expelled from the vagina. Fruitful normal women retain the semen, while sterile women usually lose it. The vulva may also show signs of infantilism e.g. lack of development of the labia majora or labia minora.

In managing our cases of sterility we have begun with a thorough investigation of the life and functions of both contracting parties. In no case included in this report was the examination of the male omitted. These examinations were conducted by J. S. Read

and include investigation as to the past performances of the man as well as for his present potency for men who have infective bacteria in their prostatic secretion can produce such inflammatory changes in the female genitalia as to prevent all hope of future pregnancy

Unless the man was potent, no attempt was made to improve the condition of the woman as regards her sterility though many women were operated on for the cure of complicating lesions. If the man was found potent the woman was put through a thorough and painstaking routine beginning with her previous history including the history of her development, illnesses, nutrition, habits of occupation, rest, and general health. Inquiry was always made into the habits of her sexual life. This was followed by a general examination of the heart, lungs, nervous system, stature, nutrition, whether emaciated or obese and followed by a pelvic examination to determine the presence of anomalies at the vulva, of the vagina in the cervix or uterus or the presence of the results of infection as shown in Skene's glands in Bartholin's glands in the cervix in the uterus, tubes, ovaries, and adjacent peritoneum.

The reaction of the vaginal and cervical secretions was thoroughly investigated and the presence of gross pathology in the fornices noted. A Wassermann test was made in all of those who presented themselves with histories of abortions or premature labors with death of the fetus. To make this study 798 case records have been reviewed. Two hundred and thirty one were found to be inaccurate or incomplete, the patients failing to return for subsequent examination or the husband's record having been omitted or for some such reason these histories were excluded from our consideration making a total of 567 from which we can draw our conclusions. From this number however there must be some further deductions such as those cases where the man was impotent, having aspermia or deformed and sluggish spermatozoa or where the original infection remained uncured. These cases total up to 64. Furthermore we have excluded those women who were found to have such gross lesions of the uterus and adnexa as to har-

them from even the possibility of pregnancy and those constitutional conditions as cardiac decompensation and diabetes which should forbid conception. Of the former there were 70 of the latter 6. Subtracting these cases we begin with 427 women in whom pregnancy is a possibility. Many of these however presented such pathology that we could not say that conception was even probable. For this reason I propose to consider the etiology and the end results of the several forms of treatment instituted in two general classes. In the one we will include infantile and congenital anomalies: 73 normal pelvis free from circulatory or inflammatory complications, 146 uncomplicated retroversions, 20 and infracervical hypertrophy, 5 making 244 in all. While in the second class we will place the remaining 183 cases all of whom presented some evidence of the results of an infective process at one or more locations along the genital tract. It is intensely interesting to note the frequency with which infection has invaded these several susceptible points. Our records show that the glands at the introitus were infected 43 times while 104 presented an endocervicitis with a mucopurulent discharge. These were complicated with a posterior parametritis in 78 instances. Fibroid tumors of varying size and of the subperitoneal type producing no symptoms and only discovered in the course of the examination were recorded in 54 cases. Ovarian cysts varying in size from that of an orange to that of a seven months pregnancy was the apparent cause of sterility in ten instances. The results of infective processes in the tubes were found in 90 cases. These were almost always associated with inflammatory or cystic changes in the ovary. In 11 cases the tubal infection had extended to the pelvic peritoneum and the patient though presenting no gross lesion which was palpable at the examination was the subject of recurrent attacks of pelvic peritonitis. In each of these cases a double hydrosalpinx was the resulting lesion. Retrodisplacement of the uterus complicated by tubal or ovarian disease was noted in 61 women. Prolapsed ovaries palpable and tender often producing

severe dyspareunia, were relatively frequent, as we find that they were noted as a complicating lesion in 92 histories. Only three patients with acute vaginal inflammation presented themselves. In 2 of these the *Neisserian* bacillus was isolated. The other showed numberless diplococci that would not stain gram negative.

In the first class which includes all the cases of infantilism, mention should be made of the frequent association of bony pelvic anomaly. Funnel pelvis, male pelvis and justo-minor contraction were noted with such frequency that we feel that the subject should have more consideration than has been given it by the gynecologist in the past, for it seems questionable when a woman has a definite bony pelvic deformity whether we are right in employing operative measures for the cure of her sterility when we know she will have a difficult operative labor. Certainly the patient or her husband has a right to the knowledge of these facts. In the 73 cases recorded as having an infantile uterus, bony pelvic anomaly was recorded 41 times. This was shown in the short external measurements, the depth of the symphysis pubes a narrow subpubic arch, the short bischial diameter or faulty inclination of the pelvic brim.

TREATMENT

The treatment, as may be supposed from a glance at the foregoing statements, was in all cases directed toward the correction of the existing causative lesion. In the first class, this included the employment of alkaline douches, of the graduated dilators, the Baldwin or Davenport stem, dissection of the cervix, after the methods of Dudley or Ponsi amputation of the cervix, and correction of uterine displacements.

In the second class both local and operative measures were employed. In those cases of uncomplicated cervicitis and endocervicitis where the tenacious mucous plug presented the obstructing lesion the mucous was removed with peroxide of hydrogen on a rotary applicator or with a Bier suction apparatus and the mucosa sterilized and an iodized phenol solution applied and the patient directed to follow this application with

douches in the recumbent position before retiring using a solution of bicarbonate of soda, a tablespoonful of the soda to a quart of water. Vaccines and destruction of the cysts with the electric cauterizing knife have also been employed, but our best results have been obtained from simple antiseptic measures. Women who have repeatedly aborted in whom the Wassermann test was reported negative were curetted and the cavity of the uterus thoroughly iodized by packing the uterus with strip gauze soaked in iodine. *This was left in place for twenty minutes* and was then removed. These patients were then advised not to cohabit for a period of three months. In the meantime special attention was given to improving the condition of their general health, by exercise, tonics and fresh air. Those presenting large fibroids not involving the uterine cavity had the tumor removed by myomectomy. Small tumors received no surgical consideration. In the 10 cases of large ovarian cyst unilateral oophorectomy resulted in 8 of the women becoming pregnant. From this observation it would seem that a large cyst of one ovary militated against the proper functioning of the other ovary until that cyst was removed. Infective processes in the tubes were dealt with by unilateral ablation, bilateral ablation with resection of the uterine ends or of the fundal segment of the uterus, or by salpingostomy. Frequently it was found that the inflammatory process had passed through the tube and time had allowed considerable resorption, and that it was the resulting adhesions which had closed the abdominal ostium and embarrassed the ovarian function. Freeing these and suspending the ovary has frequently resulted in pregnancy. In the series of retroversions complicated by tubal and ovarian disease all the women were subjected to abdominal exploration and investigation. In these the tubes were freed from adhesions, ablated or resected the ovaries suspended after the method suggested by my associate William P. Pool, and the round ligaments shortened by following one of the techniques suggested by Webster Gilliam Montgomery Coffey or Neel.

Of the cases of prolapsed ovary we have

found that an ovary out of place has its tunic thickened from circulatory stasis. So we have been in the habit of suspending such ovaries after puncture of the superficial cysts to reduce their weight and have thus established a better ovarian circulation. No resections have been done except in six cases of large white ovary in obese women with amenorrhœa where the tunic was extensively thickened. In these cases a large wedge-shaped piece of the cortex was removed and the area of excision closed with fine catgut sutures. This has re-established menstruation in all six cases and resulted in a pregnancy in three.

In the 13 cases of congenital anomalies which include extreme anteversion of the cervix with deep posterior invagination, anteversion of the body and cervix and infantile uterus the following corrective operations were done. In the anteversions of the cervix in which the invagination of the posterior lip was 4 to 5 centimeters or more in length a posterior dissection after Dudley's technique was always elected in order that the cervical os so constructed could be placed in the seminal lake. In the anteversions of the body alone we have elected Reynolds' procedure combined with the use of the intra uterine stem (Baldwin). In anteversions of the body and cervix our procedure has always been dependent upon the amount of cervical invagination. If this was considerable a posterior dissection in conjunction with the Reynolds anterior colpotomy will straighten the canal. On the other hand when the portio was short gradual dilatation, an anterior colpoplasty and the introduction of a glass stem often produced relief.

In the true infantile uterus it is questionable whether much should be done. Our only pregnant result in this type have been two ectopics and five miscarriages, for not only is the anomaly in the uterus but in tubes, ovine and vagina and the dysmenorrhœa which is prominent is only temporarily relieved by operation. In this class we doubt if any plastic procedure is of much avail as we have found that the presence of scars in a small vagina embarrasses sexual relations. Slow dilatation with Hegar's sound up to 16 to

20 millimeters and the introduction of a Davidson stem has afforded some relief but no infantile uterus in this series has developed a pregnancy and gone to term. Seven have conceived, the two ectopics referred to above and in 5 the impregnated ovum has reached the uterus and developed there only to end in an abortion at the second or third period.

Included also in our first general classification are 146 normal pelvis free from circulatory or inflammatory changes of any sort. These women had been married for periods of three years or more and had never been pregnant before applying to us for relief. The husbands were potent. The reaction of the secretion of the vaginal vault was determined in each case. One hundred and nine showed varying degrees of acidity. Examination of the semen *in situ* in these cases showed many immobile spermatozoa. In all who gave an acid reaction alkaline douches of soda bicarbonate and soda phosphate one ounce to the quart were advised to be taken on a douche pan after retiring. Pregnancies resulted in 75 or about 70 per cent making this our most successful series. Thirty-seven showed no change in secretion yet only 4 have become pregnant is the result of local treatment. No operative procedure of any sort was done in this apparently normal pelvis class. This rather goes to confirm the theory that certain women are immune to impregnation by certain men.

Of the 20 uncomplicated retroversions 11 were repositionable and could be maintained in position with a pessary. Six of these women became pregnant while 9 because of a deep posterior invagination of the cervix could not be held in place with a support. These were operated on by the Webster-Baldwin-Gilliam technique and a Dudley dissection. Of these 5 have become pregnant. This shows conclusively to my mind that the position of a cervix in its relation to the seminal lake has much to do with conception provided the secretions are not destructive to the life of the spermatozoa.

Intravaginal hypertrophy of the portio has given us not only the best surgical cures but amputation of the hypertrophied portion of the cervix has been followed by pregnancy.

going to term in each of our cases (5 in all)

In the second class made up of 183 women presenting some evidence of the results of an infective process, postpartal postabortal or gonococcic in origin pregnancy has been relatively infrequent. Of the 104 women subjects of endocervicitis with a mucopurulent discharge only 21 became pregnant. Eight conceived as a result of one local treatment in which the mucous plug was removed with a bicarbonate paste and the canal swabbed with iodized phenol. Three became pregnant promptly after the glands were destroyed with the cautery and 10 following the persistent use of the carbonate of soda douche.

Of the 90 cases which were found to have the results of infective processes in the tubes uterosacral ligaments and cervical canal the intra uterine and tubal pregnancies are equally divided, there being three of each. The abdomen was opened in all of these patients because of the history not because of the gross pelvic findings. There was invariably present a history of infection, with sterility dyspareunia and local discharge. Tubal ablations were done 35 times resections 31 times, and freeing of adhesions in 30. Two ectopics occurred in resected tubes, against 3 intra

uterine pregnancies. One ectopic occurred in a freed tube but no uterine pregnancy. Of the 54 fibroids, myomectomy was done in 20 and hysterectomy in 34. Six pregnancies occurred following myomectomy 4 going to term. Following the 10 unilateral oophorectomies for large ovarian cysts, 8 women became pregnant.

One hundred and thirty two uterine and 3 ectopics are the sum total of pregnancies occurring in 358 women in whom conception was a probability or 37 per cent.

This study has shown us that—

1. A very large number of the sterility cases applying for relief have no chance whatever of becoming pregnant, as the pathology is such as to make conception impossible.

2. The male is largely responsible for our poor results in treatment.

3. There is a definite chemicophysiologic factor in conception at present unexplainable, which is a cause of preventing conception.

4. Operative procedures on the uterus, except amputation of the hypertrophied portion have but a slight influence on the end results in the treatment of sterility and finally that each case must be individualized and both contracting parties carefully studied before any treatment is inaugurated.

SYPHILIS OF THE BODY OF THE UTERUS¹

By CHARLES C. NORRIS M.D. F.A.C.S. PHILADELPHIA

FREQUENCY

THE antiquity and frequency of syphilis is well known. It has been estimated that from 10 to 15 per cent of the urban population of certain European cities is syphilitic. In some of the hospitals in this country the percentage has been found considerably higher than this. The disease is from two to four times more frequent in men than in women probably from 1 to 4 per cent in women would be a conservative estimate.

It is only since the discovery of the spirochæta pallida in 1905 and the development of

the Wassermann test two years later that the true frequency of this form of infection has become recognized.

In spite of the prevalence of syphilis it is remarkable how seldom the disease has been observed in the body of the uterus. In a review of the literature one cannot but be impressed by the paucity of reference and our incomplete knowledge of this subject. A review of the *Index of the Surgeon General's Library* to 1914 showed but thirty-six references by thirty-one authors, and reference to the *Index Medicus* from 1909 to date disclosed only eight contributions to the sub-

¹Read before the American Gynecological Society, Washington, May 18, 1916.

ject The majority of the modern gynecologic textbooks have either no reference to syphilis of the body of the uterus or at most the subject is dismissed in a few sentences. A pleasing exception is noted in the recent work of Krankl¹ in which a chapter is devoted to syphilis of the uterus. This contains an excellent review of the literature. Our reviews showed rather frequent reference to syphilitic manifestations localized in the cervix such as chancre mucous patch gumma and a condition which the obstetricians term rigid cervix which is prone to produce dystocia. Lesions of the cervix however do not fall within the scope of this paper so that we shall omit them and consider only syphilis of the uterine body.

PATHOLOGY

Various classifications for the syphilitic lesions of the body of the uterus have been suggested. The amount of material from which to draw conclusions is as yet rather small. Many cases have been reported as syphilis of the uterus which are at least of doubtful authenticity. This is especially so of the period prior to 1905. In many cases uterine hemorrhages have been attributed to syphilis which are open to doubt.

It is theoretically possible that the endometrium may be the seat of a primary sore. This is however unproved. The fact that the spirochæta pallida may become attached to or even possibly enter spermatozoa is well recognized. In recent years the frequency with which cases of syphilitic infection in women without evidence of a primary sore being demonstrable have been recorded make this possibility worthy of consideration. On the other hand it is well proved that the spirochæta pallida exhibits a strong predilection for squamous epithelium in the primary infection. This however may be the result of misplaced reasoning as the areas naturally most exposed to chancre are covered with this type of tissue. Two other explanations offer themselves for those cases in which no primary sore has been demonstrated the one that the disease has been hereditary and

the other that the chancre has been present in the vagina or cervix and has been overlooked. The fact that chancres produce mild symptoms and are consequently not looked for offers a probable explanation in many cases. It must be remembered that in women a chancre does not leave behind it such definite evidence of its previous existence as it does in men and that the period of its existence is more transitory than in the male. The possibility of the primary sore occurring within the body of the uterus should however be considered.

In 1911 Hofman² presented before the Society of Obstetricians and Gynecologists in Berlin an interesting specimen of gummatous endometritis. The patient from whom this specimen was obtained died of chronic sepsis a few weeks after delivery. At post mortem gummata and other evidences of syphilis were demonstrated in organs other than the genital tract. The endometrium in this case contained numerous small gummatous-like tumors the tissue lying between these was infiltrated with small round cells and presented other evidences of a subacute or chronic inflammatory reaction. For the most part the normal constituents of the endometrium were unrecognizable being replaced by the gummatous tissue. This in some areas was two or more centimeters in thickness. The entire endometrial cavity was more or less involved. The uterine body was enlarged and softened.

A more common form of syphilitic endometritis manifests itself by changes in the glands and stroma the latter being chiefly involved. It is characterized by changes in the blood vessel walls and condensation of the stroma. Exactly how frequently this condition exists is not known. Chase³ recent conclusions regarding the frequency of syphilitic endometritis in general require further confirmation. Recasen⁴ has described a form of syphilitic endometritis in which the mucosa is thickened and hyperplastic. Ulceration of the endometrium is not infrequent and resulting scars may also be

¹Liepmann, Kurzgefasstes Handbuch der gesamten Frauenheilkunde. Leipzig: 1914, I, 96.

²Hofmann, Zuchr. f. Geburtsh. Gynæc. Stuttg. 9, Ixx, 8.
³Chase, J. C., Tex. St. J. M., 9, 3, 14, 95.
⁴Recasen, 8, Ann. d. Acad. d. obst. (etc.) Madrid 9, IV, 95.

observed. This is particularly likely to result during the tertiary stage. Such lesions have been described by Franceschini. The histologic picture in specimens of syphilitic endometritis probably varies not only with the stage of the disease but with the period of the menstrual cycle in which the tissue is examined. The underlying musculature is usually more or less involved. Whether or not mucous patches or other secondary manifestations occur in the corporal endometrium is unknown. Many authors¹ (Franceschini, Chiarleoni, Rille Fasola, Spinelli, Morisani and La Torre) believe that such lesions are not uncommon and that in some instances they produce leucorrhœa, dysmenorrhœa, and uterine pain.

Lesions of the myometrium may be divided into (1) a more or less diffuse metritis which is usually accompanied by an inflammation of the endometrium, and (2) gummata. In the former condition the uterus retains its normal shape, it may or may not be enlarged and is usually harder and firmer than normal. In at least one reported case the uterus was atrophic. The walls of the uterus are lacking in their normal elasticity and in some instances have been almost cartilaginous in consistency. An œdema of the uterus and per uterine tissues has also been observed. In syphilitic metritis the blood vessels as a rule present the chief changes. The lesions are not peculiar to the uterus but are those common to syphilis of the more frequently attacked areas of the body. Morisani² as a result of histologic studies of syphilitic uteri considers angiosclerosis of frequent occurrence. Findley³ in his excellent textbook considers this subject in detail and apparently concurs in this opinion. A fibrosis of the uterine musculature accompanies the blood vessel changes.

Gummata of the uterus may be single or multiple and vary considerably in size but are usually moderate in dimension, and

differ in no respect from similar lesions arising elsewhere in the body. A student of the literature pertaining to the pathology of syphilis of the uterus cannot fail to be impressed with the paucity of well authenticated cases and with the fact that as yet our knowledge of this subject is far from complete. From a clinical standpoint the question of so-called syphilitic uterine hemorrhages is of perhaps the greatest interest. The common practice of attributing symptoms which clear up under antisymphilitic treatment in patients exhibiting a positive Wassermann test to a syphilitic origin is at least open to scientific doubt. Probably the bleeding in many of these cases is properly attributed to syphilis, but on the other hand with a disease as frequent as syphilis and taking into consideration the numerous and often obscure non syphilitic conditions which cause hemorrhage it is but reasonable to assume that combination of these may occur and the hemorrhage be in some instances due to a condition totally apart from specific origin. The writer believes that this is a fertile field for further investigation. With the increasing facilities with which the *spirochæta pallida* may be demonstrated and the fact that curettage is a frequent and in many cases a justifiable method of treatment of uterine hemorrhages of obscure origin it would seem not a difficult procedure to work up a series of cases from which a definite basis of histologic study could be made. If for example a series of specimens in which the *spirochæta pallida* was demonstrated was obtained and these were then studied from a histologic basis the results of the latter would go far to establish upon a firm basis the pathology of syphilis of these structures and we would then be in a position to state positively whether or not certain histologic changes were sufficiently characteristic to warrant a diagnosis of syphilis or whether we should have to depend upon the demonstration of specific organism. With the possible exception of gummata it is doubtful whether a histologic verification is sufficient.

The German views pertaining to this subject are well expressed by Meyer.⁴ He states

Meyer, F. Deutsch. med. Wchnschr. 1911, XXXVI, 167.

Franceschini, G. *Casa d'op. Milano* 1909, LVII, 177.
 Franceschini, G. *Casa d'op. Milano* 1909, LXI, 177. *Chronic*
 lesions, quoted by Gifford, C. and Eberstadt, N. F. *Am. Gynec.*
Soc. 7, 4, 1915, abstract by Gifford and Eberstadt, *ibid.* Feb.,
ibid. *Sperry's Med. Monism*, T. Arch. d'obst. gynec. Knapk 1907,
 no 77. La Torre *ibid.*
 Morisani, T. Arch. d'obst. gynec. Knapk, 90, 10, 87.
 Findley, F. *Diseases of Women*. Philadelphia: 1903, p. 37 (from
 cases an extensive bibliography).

that very little is known about the syphilitic inflammation of the uterus but that Doederlein¹ Weber and others are of the opinion that there is no characteristic change in the uterine mucosa which can with certainty be described as syphilitic

SYMPTOMS

These naturally vary with the character of the lesion. With the present unsatisfactory status of the pathologic changes produced the symptomatology is necessarily uncertain. Undoubtedly hæmorrhage is the symptom which has attracted the most attention. We have already mentioned the fact that hæmorrhage is frequently attributed to a syphilitic origin without convincing proof. Hæmorrhage is by no means a constant symptom in endometritis or metritis in general although variation and menstruation are of frequent occurrence. In such conditions the ovaries are usually more or less involved in the inflammatory process and whether or not the menstrual irregularity occurring in these cases is the result of the uterine or the ovarian involvement is open to doubt. This naturally opens the entire and much debated cause of such hæmorrhages. Time will not permit a discussion of this subject; it suffices to say that the author is of the opinion that inflammation in either the ovary or the uterus may under certain circumstances result in menstrual irregularity but that in the majority of cases the ovary is the governing factor.

The most frequent form of hæmorrhage described is menorrhagia. In 1906 Dreyer² collected from the literature fourteen cases of hæmorrhages attributed to uterine syphilis. A year later Muratow³ called attention to the fact that syphilitic hæmorrhage from the uterus is not so rare as we might think and as evidence of this he mentions the cases of hæmorrhage which do not respond to the ordinary styptics and curettage but do well under specific treatment. He points out that in such cases the uterus may be neither enlarged nor painful but is firm in

consistency and the cervix often hypertemic. Hæmorrhages in young girls Muratow⁴ believes are frequently due to a latent form of hereditary syphilis. In 1909 Falk⁵ demonstrated before the Berlin Obstetrical Society a case of luetic ulcer of the portio associated with syphilitic metrorrhagia which disappeared under specific treatment. Recasens⁶ reported six cases of syphilitic metritis five of which were cured by treatment but in the sixth case carcinoma of the fundus was suspected and a hysterectomy was performed but upon microscopic examination no cancer was found. Merowsky and Frankenstein⁷ have described three cases of tertiary syphilis in which amenorrhœa persisted for 6 years in two cases and for 8 years in the third. In two of these the menses returned after the exhibition of specific treatment and the third menstruated vicariously through the nose after treatment was instituted. These authors attribute the amenorrhœa to either constitutional causes such as often produce amenorrhœa in subjects of pulmonary tuberculosis or to a syphilitic oophoritis.

McIlroy Watson and McIlroy⁸ applied the Wassermann test to one hundred gynecological patients in only six of whom was there a clinical history of syphilis.

The test was positive however in forty-three cases negative in forty-eight while in the remaining nine cases it was doubtful. They state that their results show that cases in which uterine hæmorrhage apart from tumor is the principal feature syphilis very frequently is present. They are also in accord with Muratow (cited above) in the belief that some of the cases of menarchial hæmorrhage are of syphilitic origin. Further work along this line has been done by Whitehouse.⁹ He studied sixteen patients with a clinical diagnosis of chronic metritis and subjected them to a Wassermann test. Only one patient furnished a history of lues. All of the others strongly denied such a

Muratow, *Ibid.*

Falk, T. *Berl. Obst. Soc.* 909.

Recasens, S. *Ann. d. Acad. de Obst. (et.) Madrid* 05.

Merowsky and Frankenstein, *Deutsch. med. Wchnsch.* 444.

McIlroy A. L. Watson H. F. and McIlroy J. H. L. *M. J.* 9 p. 00.

Whitehouse, B. J. *Obst. and Gynec.* B. *Lancet* 9 4, 1910, 3.

Doederlein, *Verh. Handb. der Gynæk.* Weisbaden 907.

Dreyer, A. *Dermat. Ztsch.* Berl. 1906 xxi 5.

Muratow, A. A. *Zentralbl. f. Gynæk.* Leipzig, 907 xxxi, 830.

possibility and there was no reason to doubt them. In spite of this, however seven cases gave a well marked positive reaction. These patients all applied for treatment on account of pelvic pain irregular and profuse uterine hæmorrhage and watery or mucopurulent discharge.

The physical signs obtained upon bimanual examination were those usually regarded as characteristic of chronic metritis namely a slight but uniformly enlarged uterus, firm in consistence, and tender upon palpation. The specimens removed from these cases show well marked fibrosis and peri and endometritis. Whitehouse believes that a true gumma does not occur in the corpus uteri. He also calls attention to the fact that although pyometra is usually attributed to malignant disease, he has observed two cases and records two others from the practice of another physician in which pyometra occurred in patients with well marked tertiary lesions and no evidence microscopically or macroscopically of malignant disease. He has never been able to demonstrate the spirochaeta pallida either in sections of the uterus or in the menstrual blood but is impressed with the necessity of testing by the Wassermann reaction all patients who present the clinical picture of chronic metritis or fibrosis.

As in all inflammation involving the endometrium and myometrium leucorrhœa is a not infrequent symptom. Various types of leucorrhœa have been described. Neumann¹ believes that the discharge is usually thin and moderately profuse. Pain, dyspareunia and other symptoms common to non-syphilitic metritis have been noted. As a matter of fact none of the local subjective symptoms are by any means characteristic of syphilis. The following is the report of a case of probable syphilis of the uterus.

Age 36 years white married 3 children, 3 miscarriages. Family history negative. Chief symptoms menorrhagia.

Personal history. Until the past five years has been a strong healthy woman. Married at 24 years. Three children, 1 8 and 7 years, healthy and strong. Six years ago the husband contracted syphilis and upon the development of the secondaries was placed upon treatment by his family physician.

Mumma, Leiber. Syphilis. Vienna. Syd.

At about this time he undoubtedly infected his wife. She, however gives no history of a primary sore, but the development of typical secondaries and their disappearance under treatment established the diagnosis. During the past six years or since the onset of her syphilis the patient has had three miscarriages, advanced respectively 3, 3 and 5 months the last of these 3 months ago. The patient has been treated by her family physician for syphilis until nine months ago (mixed treatment) when treatment was discontinued by the patient as she believed herself cured. Until coming to the University Hospital no Wassermann tests or attempt to demonstrate spirochaeta pallida had been made.

Present Illness. A five months miscarriage occurred six months ago one month later menorrhagia developed. Instead of the periods as formerly lasting 4 to 5 days, they now last 8, 10 or 12 days. The bleeding is for the first 6 to 8 hours moderate in amount but by the second day is profuse, bright red and takes on the character of a severe hæmorrhage. This continues for a varying period of time and gradually diminishes, a moderate mild flow continuing and lasting for week or more. As a result of the last three bleedings deep to the usual treatment such as rest in bed, ice ergot, etc. so much blood was lost that the patient has been much weakened. When brought to the hospital the patient had been bleeding for 3 days. For the last three periods patient has been bedridden during and for some time following the flow. Between periods and especially during the days immediately following the cessation of the bleeding there has been a profuse thin, non-odoriferous leucorrhœa. Dizziness, weakness, headache, and other evidences of anemia have been present. All these symptoms are worse toward the end of and immediately following the flow. There has been no pain. The appetite is variable and the bowels at times constipated.

Physical examination. This reveals a moderately well-nourished woman. The heart, lungs, liver and kidneys are normal. Blood, hæmoglobin 52 red blood-corpuscles, 5,000,000 white blood corpuscles, 4,500. Wassermann strongly positive.

Abdominal examination, negative.

Pelvic examination negative. Outlet multiparous. Good support in anterior and posterior wall, cervix normal in size and shows a well healed bilateral laceration. It is softer than normal and the canal is patulous, slightly dilated, just admitting the tip of the finger. The uterus is normal in size, shape and position. It is movable and not unduly tender even on deep palpation. The adnexa are normal. A careful examination fails to reveal any evidence of the site of the primary sore.

Owing to the lack of any assignable cause for the hæmorrhage, a diagnostic curettage was advised.

Operation. On moderate traction with tenaculum during an effort to draw down the cervix the instrument is e through the cervical tissue. During the curettage with a Martin curette the fundus was

perforated. No undue force had been used. In view of the evident softness of the uterus the fact that a perforation was present in the fundus the history of severe and persistent bleeding the age of the patient and the fact that he already had three living children a hysterectomy was decided upon and performed in the usual manner. The tubes and ovaries were not removed.

Convalescence was normal. The patient was placed upon a tonic and one administration of salvarsan was given intravenously before leaving the hospital and her family doctor advised as to the condition so that antisyphilitic treatment could be continued.

Pathologic description The specimen consists of curettage and uterus.

Curettings These consist of a moderate amount of macroscopically normal endometrium.

Uterus This has been removed by supravaginal amputation. It is normal in size and shape, measuring 7.5 centimeters from the point of amputation to the top of the fundus 6 centimeters laterally and 5 centimeters anteroposteriorly (through fundus). The endometrial cavity presents no abnormalities. An incomplete curettage has been performed. It measures 5.5 centimeters in depth. The myometrium is normal in thickness and is rather paler than normal cuts with ease and in the vascular layer large numbers of blood vessels are present the cut ends of which are remarkably prominent. These and the friability of the tissue are the chief peculiarities of the specimen. The myometrium is so soft that the walls may be squeezed through with ease at any point with the thumb and forefinger. In the posterior wall of the fundus is a perforation which will admit a small lead pencil.

Histologic description Endometrium The endometrium is normal in depth or perhaps slightly thickened. The surface is fairly smooth and is covered with a single layer of high columnar cells. The superficial layers of the stroma are infiltrated with blood serum, and chronic inflammatory products. At some points subepithelial hemorrhages are present. In one of these the surface epithelium has been desquamated. The deeper portions of the stroma are condensed and fibrous. Many blood vessels are observed. The majority of these possess well-developed muscular walls in which marked sclerosis is present. Scattered here and there are areas of chronic inflammatory reaction. The line of demarcation between the mucosa and underlying muscularis is well defined. The glands are normal in number size and shape and are of the interval type. The specimen thus resembles an endometrium the seat of a chronic diffuse inflammation with marked angiosclerosis.

Myometrium Four sections taken from various portions of the uterus. All present the same general histologic character. Immediately beneath the endometrium there is an ill-defined zone of chronic inflammatory reaction which gradually fades into the deeper and uninfamed myometrium. The

blood vessels are more numerous than normal and possess unusually thick walls. This is more marked in the media. The arteries and veins are both affected but the changes are more pronounced in the former. In some instances the blood vessels are six or seven times the normal size and in some the degenerative changes involve not only the vessel walls but also the adjacent myometrium periarthritis. In one or two areas thrombi are present while in a few fields vessels are observed in which as a result of endarteritis complete obliteration of the lumen has occurred. In many areas extravasations of free blood are present. The lymphatic spaces are dilated. The fibrous and muscular tissue stain poorly in the eosin and hematoxylin preparations. Much free serum is present as a result. In some areas the muscle-fibers can be seen partially separated. In some fields these edematous areas are more marked than in others but are quite as numerous in the fundus as in the lower portion of the uterine body. The chief histologic characteristics in this specimen are the angiosclerosis affecting chiefly the inner coats of the vessels and the areas of edema above described. Section fixed in Zenker's and in 4 per cent formalin solution and stained in hematoxylin and eosin Weigert's fibrin stain and Van Gieson's stain.

Diagnosis Syphilis of the uterus.

The histologic picture present in this specimen conforms closely to that described by other authors. Whether or not syphilis produces sufficiently characteristic lesions in the uterus to warrant a positive diagnosis has already been considered. In this case the changes were typical of those produced by syphilis elsewhere in the body and I have little doubt as to the correctness of the diagnosis. The histologic picture is not that of a subinvolution nor does it at all resemble those cases which are usually classified as fibrosis of the uterus. Furthermore the results of histologic examination is confirmed by the history and clinical findings. This patient contracted syphilis six years ago anti syphilitic treatment was discontinued nine months ago. Menorrhagia and other symptoms of syphilis of the body of the uterus developed three months later. The Wassermann test was at this time strongly positive. Whereas on account of the rarity of syphilis of the uterus all cases of the metritic variety in which the spirochæta pallida are not demonstrated should be viewed with doubt there nevertheless seems little question as to the correctness of the above diagnosis.

Undoubtedly the chief clinical symptom was the menorrhagia and the chief pathologic lesion the great softening and friability of the uterus together with the more typical changes usually produced by syphilis. Marked softening of the uterus has been noted by a

number of observers, but is by no means characteristic of this variety of infection. Weber¹ Bolt and others have recorded cases in which softening was a marked feature.

Quoted by Mayer, *Zeitschr. f. Geburtsh. Gynäk.*, 1904, 11, 400.
 Translated, quoted by Gellhorn, G. and Ehrenfest, H. *T. Am. Gynec. Soc.* Washington, 1916.

SYPHILITIC FEVER

IN RELATION TO GYNECOLOGICAL AND OBSTETRICAL PRACTICES¹

By FRED J. TAUSIG M.D. F.A.C.S. S. LOUIS

TO judge by the almost complete absence of reports concerning syphilitic fever in gynecological and obstetrical literature it is manifest that this interesting and at times important, symptom has received no consideration by our confreres. The extensive work of Gellhorn and Ehrenfest has shown that syphilis of the internal genitals is not as rare as some of us had previously supposed. My own more limited review of a series of cases in private and clinical experience, together with an analysis of the existing literature, has convinced me that syphilitic fever is also not such a unique symptom. If only we would be constantly on the watch to analyze the possible factors in the cases of unexplainable fever that we so frequently observe.

The diagnosis of syphilitic fever can rarely be made with absolute certainty. There is nothing characteristic about the temperature curve. In the milder more common forms the fever does not rise over 100 to 100.5 with a relatively slow pulse and lasts only a few days. In the severer type we have a remittent prolonged fever extending for weeks or even months with an evening rise of temperature to 102 to 103 and intervals of a few days at a time when the fever almost ceases. The mass of evidence concerning syphilitic fever doubtful as it may be in the individual case leaves no question that syphilis is at times actually responsible for the rise in temperature. Nevertheless, in analyzing symptoms we should constantly

bear in mind Virchow's warning not to call everything syphilis that appears in a syphilitic person or that disappears under antisyphilitic treatment. Thus we can explain fever that disappears under antiluetic treatment, in four different ways.

1. The antiluetic treatment may have destroyed not only the spirochæte but also septic bacteria that were the cause of the fever.

2. The antiluetic treatment may have so improved the patient's bodily resistance as to enable her to overcome fever due to other organisms.

3. The antiluetic treatment may have been merely coincident with a fall of temperature due to other causes.

4. The antiluetic treatment may actually have been responsible for the cessation of a fever due to syphilis.

On the other hand, we cannot conclude that a fever is not syphilitic because it ceases without antiluetic treatment, since we know that syphilis and all its manifestations are to a certain degree limited by the natural immunity acquired by the individual. Nor can we conclude that a fever is not syphilitic because it persists in spite of antiluetic treatment, since we know that certain cases of malignant syphilis will resist all known measures.

Scientific proof of syphilitic fever in any case would require the exclusion of all other possible causes, the finding of spirochæte pallida in the blood before treatment and the

simultaneous disappearance of spirochæta and fever under the customary treatment. These conditions it will of course for technical reasons be impossible to fill in more than a very few cases. In the main we must arrive at our diagnosis possible or probable by a careful estimation of the patient's history, physical conditions, Wassermann reaction and the effect of the treatment.

Syphilitic fever may be divided into (A) secondary syphilitic fever (B) late secondary syphilitic fever (C) tertiary syphilitic fever.

A *Secondary syphilitic fever* is that which we find preceding or coincident with the outbreak of the syphilitic rash. Fournier states that it occurs in about 20 per cent of all syphilitics. The rise is not over one or two degrees and the duration three to four days so that the patient ordinarily gives it no attention. At the outbreak of secondaries women often come to the gynecologist either because of local sores or on account of a complicating gonorrhœa or pregnancy. It would be well therefore for us to bear in mind that a slight rise in temperature at this time has no special significance. Whether it is individual predisposition or a virulent infection that is responsible for the occurrence of fever in one out of every five syphilitics at the time of the rash it is impossible to say. Occasionally we find that the fever is quite high and persistent. An illustration of this sort occurring in an obstetrical patient was noted in the following case, the data of which were kindly given me by Dr Ehrenfest.

Case — 29 years old married February 1, 1915 in good health began on April 15 to have a peculiar intermittent fever diagnosed by her family physician as typhoid, that lasted for six weeks. Shortly thereafter she was seen by Dr Ehrenfest, who found a faint secondary skin rash still visible and a suspicious sore on the labium minus. Widal reaction was negative and no other explanation for her fever could be found. Both the patient and her husband had a Wassermann 4+. The patient was thin and anæmic and at this time was three months pregnant. Under salvarsan and mercury a marked improvement of her general condition and increase in weight occurred.

The following important additional data were obtained from Dr C. Foulkrod of Philadelphia under whose care the patient was confined in January, 1916.

Owing to a nephritis and the generally weakened condition of the patient no antiluetic treatment was given just previous to and after her confinement. From January 19 to February 7 the patient had a remittent fever that varied between 99 to 102.6, averaging a little over 101 every evening. There was no evidence of any form of puerperal or other infection. Breasts, perineum, lochia were all normal. Finally in view of the persistent fever it was decided to give another dose of salvarsan. On that day the temperature rose sharply from 100.4 at 3 p.m. to 104.8° at 4 p.m., falling to 101.2 at 6 p.m. and 99.4 at 9 p.m. The following day there was still a rise to 101.4 but from February 9 on the temperature did not rise over 99.

The sudden temporary rise after salvarsan has been noted by other writers (Polano, Glaser). This additional occurrence of elevated temperature is clearly to be grouped as *late secondary syphilitic fever*.

B *Late secondary syphilitic fever* offers greater diagnostic difficulties and is less frequent than that coincident with the eruption. Graves has emphasized the occasional recurrence of short periods of elevation of temperature associated with other so-called constitutional symptoms in syphilitics for some months after the onset of the disease. He interprets such symptoms as due to the occasional outbreak of organisms accumulating in a latent syphilitic person. In such as are susceptible to elevations of temperature we may have at these times a short period of fever.

Every now and then this late secondary fever will be more persistent and have a higher range of temperature. A characteristic example of this group was reported by me six years ago.¹ A brief summary may be of interest in this connection.

C W. 23 years old contracted syphilis about the middle of her pregnancy. The following month a typical papular eruption, sore throat and adenitis occurred. She was put on protiodide of mercury by her physician and the eruption began to fade. Two months later I was called to see her on account of a fever starting four days previously running up to 103 and without apparent cause. Typhoid, tuberculosis, pyelitis, sepsis and appendicitis could be excluded. The persistence of fever up to 102 to 103.5 for the next ten days induced me to decide on premature labor with the hope of clearing up the diagnosis. Delivery of a living four and one-half pound child was accomplished.

without trouble. The fever persisted for three days more without any apparent cause, rising to 104 on the second day post-partum. I finally decided on the possibility of syphilis as a factor in the fever and gave bichloride of mercury gr 1-10 hypodermically on two successive days. The fever ceased at once and did not return.

Another less pronounced case came to my service at the City Hospital March 23 1916.

She was a negro who had been normally confined ten days previously. No evidence of pelvic infection or other inflammatory disease elsewhere in her body could be determined. Her skin still showed typical papular syphilitic spots that had appeared several weeks previously. There were enlarged post-cervical and inguinal glands. The Wassermann was negative. During the first six days she ran a somewhat irregular fever with a maximum of 102. She was then given two hypodermics of mercury bismate on alternate days. The fever promptly ceased and did not return during the following two weeks, at which time she left the institution. In spite of the negative Wassermann, I think we should strongly suspect syphilis as the cause of the fever in this patient.

Leblond also reports a case that belongs under this head.

The patient had contracted syphilis during her pregnancy. Under antiseptic treatment the syphilitic manifestations disappeared. Fetal movements ceased at the sixth month of pregnancy. No treatment was given for the following five weeks. Then 7½ months dead fetus was spontaneously expelled. There were no abrasions in the genital tract. There was no fever for the first seven days post-partum. Without any local symptoms or explanation elsewhere in her body the patient began to have a high remittent fever with slow pulse, good appetite, and complete absence of pain or discomfort. Antiseptic treatment resulted in prompt and permanent cessation of fever.

C. *Tertiary syphilitic fever* is much less frequent than the secondary types, but is of greater diagnostic importance. The fever is usually continuous and attended with an elevation of temperature of 102 to 103. Evidences of the syphilitic infection are usually absent and the symptoms have been for gotten by the patient. The diagnosis is therefore established with great difficulty and usually after considerable delay. To the 62 reasonably certain cases tabulated by Stern in 1912 I was able to add 21 additional cases including one of my own making a total of 83 cases. The organs primarily affected by the tertiary process in these cases were

Liver	29
Bones and joints	9
Lungs and air passages	
Nervous system	6
Spleen	4
Circulatory system	3
Hereditary	3
Female genitalia	1
Uncertain	7

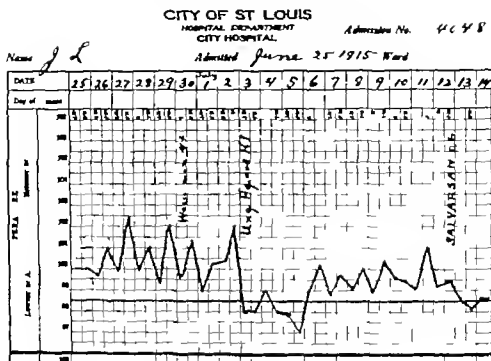
The gummatous lesions upon the skin as well as those occurring so frequently about the external genitals of women and in the rectum do not apparently give rise to this tertiary syphilitic fever. Occasional slight elevations of temperature such as we find are more probably due to secondary infection of the ulcer. It is the deep-seated gumma such as we find in the liver and the osseous system that is most apt to give rise to this symptom. Not merely the extent of the syphilitic infiltration however is to be held responsible. Glaser for example, reports a case of syphilis of the lung with complete consolidation of one lung but with a normal temperature. Extensive liver infiltrations occur without fever in fact, the absence of fever has been emphasized in differential diagnosis as pointing to syphilis. These exceptional cases of tertiary syphilitic fever must therefore be carefully kept in mind. Abdominal surgeons have at times mistaken the fever and liver enlargement in liver syphilis for a cholecystitis. Riedel reports having made this mistake five times.

In our special field tertiary syphilitic fever may be subdivided into—

1 Cases in which tertiary syphilis of the genital tract caused the fever

2 Cases in which a gynecologic or obstetrical condition was complicated by tertiary syphilis in other organs producing fever

The interesting cases of uterine syphilis reported by Gellhorn and Ehrenfest were in part attended by tertiary gummatous infiltration of the neighboring connective tissue. I had occasion to examine most of these patients personally and some were for a time in my service at the City Hospital. In going over the temperature charts of three of these cases, those in which there was the most pronounced gummatous infiltration of uterus and parametrium, I found that all



three ran a temperature on admission that could not readily be explained except on the basis of their syphilis. In observation X (B L 307-13) the admission temperature was 101 but the subsequent records are missing. In observation VI (M B 10612-16) at the time of admission in November 1915 when the cervical lesion was comparatively small the temperature went up to 99.5 to 100 for 4 days after admission. On her second admission in January 1916 the cervix and surrounding parametrium were converted into a nodular mass such as I had never seen except in carcinoma. Only the histologic picture could convince me that this mass was really a gummatous infiltration. This woman ran an irregular fever ranging from 101 to 103.8° in the evening. While there is no denying that the ulcer was secondarily infected the syphilitic process was essentially the cause of her death and in view of the malignancy of the condition and the absence of any particular symptoms from the secondary infection the probability is that the fever was due at least in part to syphilis.

I should draw a similar conclusion from the data at hand concerning the case of malignant syphilis of the uterus reported by Hoffmann. Hoffmann speaks of the case as one of chronic

sepsis following childbirth. The colon bacillus was to be sure found in the blood culture nevertheless autopsy findings revealed not the picture of a severe colon infection but that of extensive gummatous infiltrations in the uterus right tube and ovary retroperitoneal glands lung and liver. I think the question may fairly be raised whether the fever in this case was not due to spirochate sepsis.

Turning now from these merely suspicious cases of tertiary syphilitic fever we come to one concerning which there can be little doubt as to the correct interpretation. It was reported as observation XV (Callhorn and Ehrenfest).

J L (Admission No 4048-15) colored twenty-eight years old. No miscarriages. One normal confinement ten years previously. Entered hospital because of a blood tinged vaginal discharge with pains in the right lower abdomen. Examination revealed oedema of both labia majora and minora with a small typical tertiary ulcer under the right labium minus and an indurated uterine tube. Cervix encased in an infiltration extending to the pelvic wall Wassermann 4+. There was a hyperleukocytosis nor any high fever such as you would expect with a large acute pelvic exudate due to septic infection. The bedside notes attached to the history shows however that there was a rise of temperature and moreover one that reacted so distinctly to the antisyphilitic treatment that

there can be no reasonable doubt of the diagnosis of *tertiary syphilitic fever*. The exact description of the changes wrought by the treatment upon the pelvic mass are equally convincing and are mutually corroborative of the nature of the affection.

The accompanying temperature-curve is very instructive. The temperature ranged from 100 to 101.4 from June 25 the day of admission, to July 3 the day that the patient was first put on unguentum hydrargyri and increasing doses of potassium iodide. The temperature fell to normal after a few days and then began again to become elevated, though not as high as before. Immediately subsequent to the injection of 6 salvarsan the fever ceased completely and did not return.

Cases in which a gynecological or obstetrical condition is complicated by tertiary syphilis in other organs producing fever are occasionally to be found. Two such cases have been recently reported by Glaser. One patient, the wife of a contractor developed an intermittent high fever following confinement. There was a swelling of both liver and spleen but no indication of pelvic infection. Malaria, septicæmia, and typhoid could be excluded bacteriologically. The husband acknowledged syphilis. In spite of a negative Wassermann salvarsan was given with sudden and complete cessation of fever and a disappearance of the enlargement of the liver and spleen.

The other case developed a persistent fever after a hysterectomy. No cause for this was apparent. A secondary laparotomy threw no light on the subject. Pains in the lower limbs suggested a luetic periostitis. Wassermann reaction was found to be 4+. Antiluetic treatment brought immediate cessation of fever a gain of 18 pounds in weight and disappearance of the bone symptoms.

Such cases should put us on our guard in every case of obscure persistent fever complicating a pelvic condition, to have a Wassermann reaction made and to try the effect of antiluetic treatment.

CAUSE

The cause of syphilitic fever has been the subject of considerable debate. Some insist that we must explain it on the basis of a

secondary infection with other bacteria (Rosenthal, Kirckheim) but the majority feel that the evidence at hand justifies positively the conclusion that the fever is due to the spirochætae and their toxins. Sobernheim considers it possible that the rise of temperature is due merely to the absorption of products of tissue necrosis and is therefore independent of the organism itself. If this were true however we should not expect so immediate an effect upon the temperature from antisyphilitic treatment but rather a gradual cessation of fever. Schlegelmann and others believe that when syphilis attacks the liver we are more apt to have fever since interference with the metabolism of that organ causes elevations of temperature. In this connection Stern points out the frequent association of fever in the secondary stage of syphilis with a mild degree of icterus indicative of interference with liver function. Monier and Fournier believe syphilitic fever is more frequent in women than in men but this statement has not been sufficiently confirmed. The most plausible explanation why some have fever and others do not is that put forward by Stern. In syphilis without fever it is possible that only the spirochætae enter the circulation while in those having fever the spirochætae plus their toxins get into the blood and it is the latter that produce the rise in temperature.

Additional information as to the cause of syphilitic fever may come out of our study of the rise of temperature that is occasionally seen after injections of mercury or salvarsan. Iolano found in 12 out of 106 cases of secondary lues a temporary elevation of one or two degrees after mercurial injections. Gron reports a similar occurrence in 20 out of 100 cases. Glaser found that such a rise of temperature after salvarsan or mercury injections given with the utmost precautions occurred with greater frequency in latent lues. He explains the symptom as due to the death of larger numbers of spirochætae. The resultant liberation of their endotoxins causes sufficient irritation to produce a moderate degree of fever. Bauer also found a rise of temperature after the first injections in liver syphilis.

For detailed history and description of the physical examination I must refer the reader to the article by Gailborn and Zierler on "Syphilis of the Internal Genital Organs" in the *Report on Syphilis Association Gynecological Section*.

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OBSERVATIONS ON THE OCCURRENCE OF SYPHILIS IN THE UNIVERSITY OF MICHIGAN OBSTETRIC AND GYNECOLOGIC CLINIC

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FORTUNATELY due to the thorough and exhaustive work of the referents the participants in this symposium on syphilis in its relations to obstetric and gynecologic practice can omit introductions and references to the literature and confine themselves strictly to their portions of the discussion.

It is only within the past five years since the discovery of the spirochæta and the Wassermann reaction that syphilis can be said to have been studied with any degree of scientific accuracy in the obstetric and gynecologic clinic in the University of Michigan Hospital. Active cases of syphilis with abundant skin or mucous membrane manifestations were recognized and the proper treatment instituted but we were quite ignorant as to the extent of latent lues with the result that many cases passed unrecognized and the patients suffered accordingly. While the system carried out in the University Hospital for the recognition and treatment of syphilis is not without its faults and no doubt could be greatly improved upon it has served its purpose as a beginning and is vastly superior to no system at all.

For the past year there has been a hospital rule that every in-patient should have a Wassermann taken and while the rule has not for various reasons been so strictly adhered to as would be wished, its value is gradually becoming realized so that more and more of such examinations are being made from

each clinic. At the present time the hospital serological laboratory is making something like five or six hundred Wassermanns a month and as the serological records are most carefully kept, data is accumulating from which most valuable conclusions can be drawn.

It is the unwritten rule of the Hospital that all cases of syphilis be referred, not transferred to the Department of Syphilology for examination, advice or treatment. This is a most fortunate custom for each case is thus seen by an expert on the disease in question and an authoritative diagnosis is secured. In the same way the treatment is not haphazard as may be the case when not carried out by a specialist. If the report which is to follow can be considered of any value it will largely be due to the accurate and careful work of the serological laboratory and the scientific nature of the work emanating from the Department of Syphilology of which Professor Udo J. Wille is chief and to whom I tender my grateful appreciation.

It will remain for others to point out when and how the Wassermann reaction may fail as a test for lues. Undoubtedly it does fail in a negative way since it is fully recognized that an individual may have the disease and not show the reaction. Yet the test is of undoubted value when positive and if carried out in a series of cases is a fair indication of the frequency of the disease especially if the doubtful cases be checked up by the examinations of an expert.

First as to the frequency of syphilis in a general hospital as revealed by the Wassermann examination. The results in 2000 cases have been tabulated excluding patients admitted to the Department of Dermatology and the Departments of Syphilology and Neurology, since the inclusion of the large number of syphilitics in these two services would have interfered with the purpose of the investigation which was to ascertain the frequency of syphilis in average hospital patients.

In 2000 patients there were 110 distinctly positive Wassermans in which the diagnosis in almost every instance was confirmed by the Department of Syphilology. Among the doubtful reactions there were 8 in which the patients were afterward proved to be syphilitic. This shows that practically 6 per cent of the general run of hospital patients are syphilitic. Making allowance for the possibility that some luetics may have given negative reactions and that re-examination of the doubtful cases might have given some positives it is fair to assume that from 6 to 8 per cent of the patients in this particular hospital excluding certain clinics were syphilitic.

The percentages varied in the different series as can be seen by the following:

	Per cent
Obstetrics and gynecology	4.8
Medicine	4
Ophthalmology	3.7
Otolaryngology	5.0
General surgery, orthopedics and genit. urinary	4
Pediatrics	0

The proportion of syphilitics in this hospital material is on the whole rather low. Subsequent reports may show decidedly higher figures more in agreement with those from other hospitals. Possibly the nature of the hospital material accounts in some measure for the low percentage of syphilis since the patients are mostly from the country districts. Be that as it may the figures are presented for consideration as a contribution to the subject under discussion.

SYPHILIS IN THE OBSTETRIC CLINIC

There were 18 undoubted cases of lues in the 381 obstetric patients examined or 4.7 per cent. These patients were given the Wassermann test; their histories taken with

special reference to syphilis and all positive and doubtful cases referred for diagnosis to the Department of Syphilology.

In explanation of this low percentage of syphilis among a class of patients where the ratio apparently should be high it may be said that it is probably due to the class of patients from which the material is drawn. Although 62 per cent of the material is made up of illegitimates the average age of the 381 patients being 23 years, as a class the patients have not been unduly exposed to syphilis. They are country girls, waitresses, stenographers, telephone operators, very few being prostitutes or street walkers.

The laboratory reports show the varying degrees of intensity of the Wassermann reaction, its doubtful nature or its absence. Of the 18 undoubted cases of syphilis there were 12 with 4+, one with 3+, with + and 2 with = reactions, while in one instance although a Wassermann was not obtained on the mother the fetus showed a 3+ Wassermann and the placenta was syphilitic.

HISTORY OF LUES AND CORRESPONDENCE WITH THE RESULTS OF WASSERMANN EXAMINATIONS

This is an interesting field for investigation since it shows that in the majority of instances even where particular attention is paid to the history nothing suggestive of syphilis can be found. There was a positive history of luetic infection in 8 of the 18 cases. Of these 5 gave 4+ Wassermans, 1 a 2+ while 2 were doubtful or =. On the other hand where the histories were doubtful in three cases all gave 4+ Wassermans. In 4 cases the histories were entirely negative as to syphilitic infection but of these 4 gave 4+ reactions, 2 were 1+ while in one case the Wassermann was not obtained, the evidence of maternal syphilis being gained from an examination of the fetus and placenta.

PHYSICAL SIGNS OF SYPHILIS

In only 8 cases out of the 18 syphilitics were there positive signs of lues as revealed by careful physical examination. Of these 5 gave 4+ Wassermans, 1 was 3+ while 2 were = or doubtful. On the other hand in four cases

where the results of the physical examination were doubtful all gave 4+ reactions. In 5 cases there was entire absence of signs of lues on careful physical examination although in two of these cases there were 4+ positive Wassermans in 2 reactions were+ while it was not obtained in one case.

This is additional proof of what has long been known that in women in particular there may be few or no signs of syphilis although from other information undoubtedly the disease is present.

TREATMENT DURING PREGNANCY AND ITS EFFECT

The results of treatment of the syphilitic mother and the effects of such treatment upon the child prior and subsequent to birth are of especial interest to the obstetrician.

Of the 18 luetics, 14 received treatment, 7 before and 7 after labor while 4 patients refused treatment. The treatment consisted of varying doses of salvarsan and mercury.

There were 12 full term labors and 6 premature deliveries among the 18 luetics. All but one of the 6 patients receiving treatment before labor carried their children to full term. Of the other 6 women going to full term although in all but two instances they gave 4+ Wassermans the other signs pointed to old infections except in one case where infection took place at the seventh month. Of those receiving treatment with full term labors two were conceptional infections while the others were infected two to four years previously. Five of the six women who miscarried received no treatment before or during pregnancy. In all except a single case where the infection was old infection occurred at the time of or very soon after conception.

This is a very good showing for the treatment of the syphilitic pregnant woman so far as an aid in carrying her child to full term is concerned and shows that salvarsan and mercury are well borne by the syphilitic mother. Exceptions to this statement may be found in the literature but should not deter us from instituting vigorous treatment with

both salvarsan and mercury in our pregnant syphilitic patients.

THE RESULTS OF WASSERMANN EXAMINATIONS ON NEWBORN INFANTS

It is a routine procedure in the obstetric clinic to collect blood from the umbilical cord in a test tube and send it immediately to the Serological Laboratory for examination. In no case where the maternal blood in the 381 cases examined gave a negative Wassermann reaction was the newborn infant's reaction positive. In fact only 3 of the children of the 18 luetic mothers gave positive Wassermann reactions at birth and these mothers received no treatment during pregnancy. Two babies whose mothers received no treatment during pregnancy while giving negative reactions at birth gave positive reactions later at the twelfth and fourteenth week respectively.

Thus it would seem as if treatment of the syphilitic mother during pregnancy had a favorable effect upon the child although it must not be lost sight of that the manifestations of syphilis may develop later. As it is the rule of the department that no child of a syphilitic mother with or without serological and physical manifestations of the disease shall be sent out for adoption it will be an easy matter to ascertain the subsequent histories of the children of luetics who gave no evidence of disease when they were discharged from the maternity. This investigation on latent syphilis is now being carried on and will be reported upon later.

SYPHILIS IN THE GYNECOLOGIC CLINIC

The Wassermann test was made upon 390 gynecologic patients. Nineteen of these patients gave 4+ Wassermann reactions one a 3+ while two others with less marked reactions were judged to be luetic, making a total of 22 patients among the number examined or a percentage of syphilitic patients of 5.6.

The average age of these 22 patients was 22 years 16 were married and 6 were single.

A definite history of syphilis was elicited in only 5 of the 22 cases while in one case it was suggestive. In only one case was a

definite history of lues in the husband obtainable

The above shows the great importance and value of systematic Wassermann examinations upon gynecologic patients. If such systematic examinations be not employed local lesions may be attended to surgically and by other methods of treatment but a far more important general disease will in many cases be overlooked and no attempt made to cure the patients. Wassermann examinations are particularly important in women since in many instances the diagnosis can only be made in this way as the local manifestations of the disease are far less marked in women than in men. Many cases puzzling to the gynecologist in the past because of failure to be restored to health may be explained at the present time for many of them were undoubtedly cases of latent syphilis.

The findings in the 2 luetic patients as reported by the Department of Syphilology are extremely interesting and show what a great aid is the Wassermann test in the establishment of the diagnosis.

There were 15 cases of latent syphilis all giving 4+ or 3+ Wassermann reactions but with few physical findings in most cases only a slight adenopathy. Certainly such physical signs without the aid of the Wassermann test would have been apt to escape the notice of even the gynecologist most expert in general physical examination.

Another interesting feature about this group of syphilitics with gynecologic conditions was that in no patient was the diagnosis made from an inspection or palpation of the genital organs. Again in no case from the material submitted to the pathologist was the diagnosis of syphilis made by microscopic examination. Undoubtedly this would not be true of other gynecologic clinics where the lesions of recent acute syphilis predominate but these are pueral clinics and do not represent average gynecologic material. It is also possible that future investigations of the material at our disposal in the light of what will be learned from the discussions at this meeting will enable us to recognize what heretofore has escaped our observation.

SUMMARY AND CONCLUSIONS

1 Only by routine Wassermann tests will the obstetrician and gynecologist best serve the interests of his patients.

Especially is this true in hospital practice where even careful histories fail to arouse suspicion of latent syphilis.

3 Out of 600 in-patient in the University Hospital excluding two service the proportion of syphilitics was 6 per cent.

4 The nature of the hospital material will determine the percentage of lues but in the average hospital the ratio will not be far from 8 to 10 per cent if the entire hospital population be included.

5 The same holds true for the proportion of syphilis in any special clinic the percentage varying according to the nature of the material.

6 The percentage of lues in 381 cases in the University Maternity was 4, as shown by the Wassermann reactions and expert physical examinations.

7 In 18 cases of syphilis among the number examined only 8 gave a history of lues.

8 In only the same number (8) were there positive physical signs of lues.

9 As shown by the histories of the 18 cases there is a greater chance for the syphilitic mother treated by salvarsan and mercury to give birth to a living full term child than where no treatment be given during pregnancy.

10 The newborn infants of the mothers so treated do not give positive Wassermann reactions although undoubtedly they are syphilitic and later probably will show signs of the disease.

11 A certain proportion of the newborn children of untreated syphilitic mothers will give positive Wassermanns.

12 Out of 390 gynecologic patients subjected to the Wassermann test 22 or 5.6 per cent gave positive reactions.

13 In only 5 of the 22 luetic patients was there a history of syphilis.

14 Hence the importance of such examinations or a serious general disease will be overlooked and the gynecologic patient will remain uncured.

THE SPECIFICITY OF THE WASSERMANN REACTION

By RUDOLPH BUHMANN M.D. S. Loos

SINCE the introduction of the Wassermann reaction into the realm of medicine it has taken its place in the front rank of the various laboratory tests and reactions as an aid to the clinician in clearing up many of the obscure cases with which he is confronted. It has received both praise and condemnation at the hands of these clinicians: praise if it aided them in the diagnosis of some complicated case, and condemnation if it did not coincide with the clinical findings.

The reaction is based primarily upon the Bordet-Gengou phenomenon of complement fixation: that is the presence of an immune or antibody in the blood serum in conjunction with the specific antigen will fix the complement. The fixation of the complement is determined by the addition of corpuscles and their amoebocytes. If hæmolytic takes place the complement has not been fixed; if however hæmolytic does not occur the complement has been fixed. To illustrate the serum from a typhoid fever patient in conjunction with an emulsion of typhoid organisms fixes the complement and prevents hæmolytic taking place upon the addition of corpuscles and their amoebocytes.

Upon this theory Wassermann assumed that the serum from a syphilitic patient plus its antigen would likewise fix the complement. However as the organisms were not then obtainable in pure culture he substituted for his antigen a watery extract from tissues rich in spirochætae. By this method he obtained a fixation of the complement when the serum of a syphilitic person was used whereas there was no such fixation when the serum was from a normal person. It was therefore assumed that the reaction was the result of a specific antigen and antibody combination. This may have been true as Noguchi (4) has obtained fixation of the complement with the serum from some syphilitic patients, with an antigen made from an emulsion of spirochætae in pure culture.

The specificity of the reaction, however, received a setback a short time later when it was shown by Levaditi Yamanouchi (1) Porges and Mier (2) Landsteiner Muller and Potal (3) Noguchi (4) and others that alcoholic extracts of normal as well as syphilitic organs had the properties of binding the complement in the presence of serum from a syphilitic individual.

Although the true explanation of the nature of the reaction is lacking it is known that it does not correspond in the ordinary biological sense to that between antigen and antibody as was originally believed. Subsequent work has tended to indicate that it is due to an interaction of lipoidal substances. Future work along the lines of immunochemistry may ultimately elucidate the peculiar character of the reaction. Should such be the case, however the diagnostic value of the reaction will not thereby be increased.

From the foregoing it is obvious that the reaction is not a specific one. Now the question naturally arises: "May conditions other than syphilis give a positive reaction?" If one accepts the reports in the literature then he must believe that almost all the diseases to which the human system is heir will give positive reactions.

Thus positive reactions have been reported in frambosia (Bruck 5 and Hoffman and Blumenthal 6) in which the etiological organism is the spirochæta pertenius. In recurrent fever and dourine Korschun and Liebfried (7) report 50 per cent positive reactions. The organisms of these three diseases are very closely allied to the spirochæta pallida, which may account for the positive reactions in them. Eichelberger (8) reports positive reactions in 40 per cent of a series of scarlet fever cases. Jacobovis (9) 18 out of 55 cases. Weil and Braun (10) report positives in sepsis cancer typhoid fever tuberculosis, and diabetes. Wechselman and Meier (11) Eitner (12) Jundell, Almkvist and Sandman (13) and others report positives in leprosy. Boehm

(14) Reinhard (15) and Valerio (16) report positives in malaria Halbstaedter Mueller and Reiche (17) report positives in measles varicella and pertussis Treuber (18) reports positives in lymphosarcoma Boa and Peterson (19) report 3 positives out of 60 cases of chloroform narcosis Wolfsohn (20) and Reicher (21) report positives in veronal morphine scopolamine ether narcosis Dreyer (22) in lead poisoning Richards (23) in diabetes with acidosis Lassen (24) in sarcoma Hesse (25) in 9 of 11 cases of pemphigus Sutherland and Mitra (26) in 9 of 50 cases of malaria (3 of these were leucic) 10 out of 58 of kala azar 7 out of 34 cases of leprosy Verdozzi and Urbana (27) report 8 positives out of 9 cases of cancer of the liver Craig (28) reports that the presence of certain strains of staphylococci and streptococci will convert negative reactions into positive one Caan (34) reports 3 positives out of 85 cases of carcinoma and Simon (29) Duanay (30) and Zubrycki (31) report positives in eclampsia with jaundice Serum heavily laden with bile will occasionally prevent hemolysis taking place without the addition of an antigen

The above reports however must be accepted with a great deal of reservation for the following reasons

1 The majority of these reports date back to the infancy of the reaction

2 The liability of error on account of the delicacy of the technique required in the performance of the reaction

3 As our knowledge of the technique has advanced the number of positives in diseases other than syphilis has gradually decreased

4 Statistics of results obtained by other men in which it is the exception that positives are obtained in diseases other than syphilis namely Browning and McKenzie (35) Schridemandel (36) and MacCormac and Merson (37)

The abundance of material furnished at the Barnard Free Skin and Cancer Hospital gave me the opportunity to compare the various statistical enumerations above and to contribute to the question The following cases were examined 136 cases of malignant diseases

53 cases of skin diseases and 99 cases of miscellaneous diseases The original Wassermann method was adhered to with two exceptions namely the quantity of all of the reagents was reduced one half and the watery extract antigen was replaced with alcoholic extract One half the original quantity was used because too much blood would be necessary since two or more antigen were used in each case

Hemolytic system sheep corpuscles their amboceptor and complement

Sheep blood obtained from an abattoir immediately deheminated washed not less than five times with sterile saline solution and used within twenty-four to forty-eight hours This plan is uniformly adhered to The variation in the density of the suspension is then but negligible Occasionally one will meet with cell that are unduly fragile and will therefore show some hemolysis This is easily determined by making up a 1 per cent suspension of the cell in normal saline solution placing them in the refrigerator overnight and if the supernatant fluid is tinged some hemolysis has taken place These are not to be used

Amboceptor The anti sheep rabbit amboceptor is used This remains fairly constant for a period of from four to eight months if sealed in small ampule and kept constantly in the refrigerator

Complement Fresh guinea pig serum is used As there is more or less variation in the strength of the complement in different pigs it is preferable to use the pooled blood from several healthy animals The complement and amboceptor must be titrated for their respective units before the day's work is begun

Intigens It has been my custom to use three different antigens for the past two years These are all prepared by a similar method as follows

The tissues at once are minced and placed in absolute alcohol (in the proportion of one gram of minced tissue to ten cubic centimeters of alcohol) incubated for a period of time (usually four to six weeks) with frequent agitation then filtered and kept at room temperature Antigen of guinea pig heart

antigen B liver from a case of congenital lues or liver from an infant antigen C a cholesterol fortified human heart prepared according to the method of Walker and Swift (32)

The antigens must be carefully titrated for their anticomplementary hemolytic and antigenic properties before they are used. The guinea pig heart and the foetal liver antigens are not as sensitive as the cholesterol fortified one. The latter is unquestionably the most sensitive and reliable of all of the antigens.

The material investigated may be divided into three groups.

TABLE I.—SKIN DISEASES

Disease	Number of Cases	Negative	Positive	Weakly Positive
Pityriasis rosea	8	8	None	None
Scabies	15	5	None	None
Dermatitis	5	5	None	None
Eczema	5	5	None	None
Total	33	33	None	None

In this series of skin diseases are eight cases of pityriasis rosea, which resembles very much the secondary eruption of syphilis and frequently the clinician has to rely upon the Wassermann reaction to arrive at a correct diagnosis.

TABLE II.—MALIGNANT DISEASES

Disease	Number of Cases	Negative	Positive	Weakly Positive
Sarcoma			None	None
Malignant desmoma	5	5	None	None
Glioma of brain			None	None
Carcinoma	7	9 ¹	9	
Total	36	5	9	

This table gives the very interesting result, that of 136 cases of malignant diseases only 9 were positive and two weakly positive and 125 gave negative results. The sarcoma and carcinoma represent the various types of these diseases and in each case was the diagnosis confirmed by microscopical examination. Of the 9 positive reacting cancer cases 6 became negative or remained only weakly positive under antiluetic treatment. The remaining 3 cases discontinued treatment or failed to return for later observation. Three of the positives were epitheliomata of the tongue probably developing on a hectic

base as the patients gave a history of what was no doubt leukoplakia. The two cases that reacted weakly positive were carcinomata of the cervix.

TABLE III.—MISCELLANEOUS DISEASES

Disease	Number of Cases	Negative	Positive	Weakly Positive
Typhoid	1	1	None	None
Peri-ocular anemia	4	4	None	None
Hodgkin disease	1	1	None	None
Postinfectious	1	1	None	None
Scarlet fever	5	5	None	None
Leprosy	0	1	5	None
Tuberculosis	35	13		None
Malaria			None	None
Arthritis	6		None	None
Meningitis			None	None
Streptococcal infection	4	4	None	None
Total	99	44	5	None

Table III shows that of 99 cases, including various diseases 94 reacted negatively and only 5 positively. Three of the 5 positive reacting ones were leprosy of the tuberculous type. The other two were tubercular cases both of which gave a fairly definite history of lues.

INTERPRETATION OF THE REACTION

1 weakly positive reaction. Anything over 50 per cent hemolysis should not be interpreted as a syphilitic reaction unless there is some clinical evidence of the disease or a definite history of the infection. An individual should be spared the humiliation and condemnation of being branded with this dreaded disease with no more evidence than a weakly positive reaction. On the other hand it is the duty of the physician to protect the innocent from the possibility of an infection from one who suffers from this disease. There should be co-operation between the clinician and the serologist in all such doubtful cases repeated Wassermann reactions should be made. If these do not clear up the case then the provocative treatment should be resorted to preferably a dose of salvarsan or ten days or two weeks of mixed treatment, which usually has the effect of producing a stronger reaction if syphilis be present.

A strong positive reaction except in very rare and easily differentiated cases is definite

HIGH DEGREES OF HEAT VERSUS LOW DEGREES OF HEAT IN THE TREATMENT OF CANCER OF THE UTERUS

B H J BOLDT M.D. F.A.C.S. N. Y. E.A.

YOUR secretary has requested me to add a ten minute contribution to the symposium now before your society, my part to be on high degrees of heat compared with low degrees of heat as a palliative treatment for advanced cancer of the uterus. Inasmuch as I but recently reported the result of my observations, I can add little to that which I published in the *American Journal of Obstetrics and Diseases of Women* January 1916 except to say that judging from the many letters received from colleagues who have had experience my position is amply justified and to add that Dr F W Bancroft, of New York, has verified my position by an autopsy on a patient who had been subjected to low heat, in accordance with the technique advocated by Dr Percy.

I do not wish to be understood as detracting from the usefulness of low heat application. On the contrary I commend it but not as the method to be used under all conditions. It should be reserved principally for a second application, after the rapid destruction has been accomplished by high heat, and the charred eschar so caused has been thrown off and for cases wherein the malignant process has so far advanced that the thorough application of high heat would endanger the bladder or rectum, despite great care to avoid injury. It may happen as a secondary result, that a slough may be caused and thus a vesical or a fecal fistula be established. Although such fistulae frequently close spontaneously we know from experience, that if they do not close how difficult it is to bring about a closure by operation.

Then too the danger from secondary hemorrhage is not less with low heat than with high heat. Indeed it is held by some to be greater when low heat is used though to judge from my own experience that position is untenable.

These however would be negligible fea-

tures if with low heat alone we could accomplish a better final result. So far there has been no evidence presented by any one who has had experience with both methods properly tried on a series of patients that showed the superiority of one over the other. It may be admitted that now and then heat has cured a patient although personally I have not seen such an instance.

Indeed were I to rely solely on the report of results I should relegate heat to the has been remedies and only advise radium. But we do know that with heat properly used, and applied in properly selected cases, we have a therapeutic agent that sometimes gives remarkably good palliative effects. Dr Percy who is the strong advocate of low heat makes claims for it that I have been unable to substantiate. He asserts that it has a deeper penetrating ability on the tissues and that it destroys carcinoma elements farther away from the surface to which it is applied than high degrees of heat, and hence its potency to cure some carcinoma patients of their disease. The late Dr Byrne to whom the medical profession is indebted for bringing the treatment of cancer of the uterus with heat into vogue, many years ago made similar claims for high degrees of heat but he was unable to convince me that it was more than an excellent palliative agent. So far as I know no proof of further efficacy has been demonstrated by Percy. On the other hand the clinching facts, as shown in Dr Bancroft's case and in my case, in which autopsies were procured and a microscopical examination of the tissues made are that the cancer-cells were not destroyed to any appreciable distance from the surface of application of the low heat, certainly not farther than would have been the case with the high heat application.

Dr Charles Mayo in discussing my paper on this subject at the last meeting of the Southern Surgical and Gynecological Society

cited in proof of the curative power of low heat, used as Percy directs a number of instances in the Mayo clinic at Rochester of what seemed inoperable cases of uterine cancer that subsequently became operable adding that when the uteri in these cases were examined by the pathologist he failed to find any evidence of malignant disease in them. I cannot however accept this statement a verification of the hypothesis that low heat destroys cancer element some distance from the surface of heat application. It can be accepted only as a personal belief based upon clinical manifestation of the individual patient. In such a case my view would be that the patient had in connection with the cancerous cervix a pure inflammatory condition either parametritis or a local pelveoperitonitis which caused more or less immobility of the uterus and that as the result of the heat treatment the nearby structures became dried out and mobility of the uterus ensued but the cancer itself had not penetrated beyond the depth of the cauterization. Such clinical misstatement we also see with high heat. The inflammatory infiltration may subside but the carcinomatous infiltration remains. To disprove my contention it is necessary that the operator should when the abdomen has been opened remove a part of the suspicious infiltrated area in the pelvis a reasonable distance away from the cervix and have it examined by a competent pathologist. If that shows cancer nests and the uterus becomes mobile subsequently so that a radical operation may be done and the specimen then removed by a real radical operation fails to show cancer element we are in a position to grant the alleged deep destruction of cancer element but not until such proof has been shown.

I call attention to those instances in which recovery followed a simple extirpation of the uterus despite the presence of some parametrial infiltration and in which after a period of a few months a re-examination failed to

show evidence of infiltration. I myself recall two such instances.

But let us pass from the theoretical and clinical test to the crucial scientific test the test being a deduction as the result of an examination of tissue treated by low heat in the *living* body by which we may get evidence which is beyond the possibility of deception. This test showed beyond a scintilla of doubt that cancer nests were destroyed only in the cauterized area and in the area immediately in contact with the cauterized surface. Even within only one millimeter of the charred zone apparently unaffected cancer nests were found. Surely high heat cannot exert a less destructive action on cancer-cell.

It is far from my intent to detract anything from the credit of our colleague Dr. Percy but I believe that his enthusiasm misled him as the result of his clinical experience to become imbued with unfounded hope.

Byrne although not the first man to use heat as a palliative measure was the one to bring this treatment to a fairly extensive acceptance and was equally enthusiastic as for a time were his follower. And when I say his followers (and I am one of them) I mean those who cauterized thoroughly as was directed by Byrne not superficially as I have seen done time and again and yet called cauterization by the Byrne method.

To speak for myself I can say conscientiously that I obtained and am obtaining with high heat results equally as good as those obtained by Dr. Percy with low heat particularly since I open the abdomen as insisted upon by Percy. It is my belief that if Dr. Percy will use either high or low heat according to indications he will arrive at similar conclusions especially if he subjects his work to a critical scientific analysis whenever opportunity presents itself. I believe that the advice of our late colleague Dr. Pryor to tie the internal iliacs in cases of cancer of the cervix is also of importance as a palliative measure.

NOTES ON THE PAST PRESENT AND FUTURE OF GYNECOLOGY
OBSTETRICS AND ABDOMINAL SURGERY

B. J. WESLEY BOVÉE M.D. F.A.C.S. WASH. D.C.

YOUR organization now holding its forty first annual meeting is the parent American body of the part of medicine represented by gynecology obstetrics and abdominal surgery. As a national gynecological organization it is the pioneer of the world. Composed as it is of the men most famous in America in these spheres of endeavor for the benefit of the human race its prestige is unquestioned. To be the chosen president of it should be the laudable ambition of every earnest and scientific American worker in the specialties mentioned. It is therefore with no little pleasure and pride that I sincerely acknowledge the signal honor you conferred on me last year by elevating me to this important position. It is not always brilliancy that appeals to the hearts of one's confreres, as one is bound to observe in this selection. Having been for many years at least a consistent worker in and for this society I am prompted to believe the selection was due alone to that reason. My pride surely is pardonable when we recall the names of my very illustrious predecessors. Certainly the names of J. Marion Sims, T. G. Thomas, T. A. Emmet, Barker Goodell, Peaslee, Baldy Davis, Williams, Kelly and many others who are or have been Fellows in this society will stand until the end of time as great medical geniuses. Nor can I allow this opportunity to pass to pay a tribute to the parents of this society, Chadwick, Munde, and J. Taber Johnson all of whom have been its presidents. Though death prevents our extending the hand of fellowship to the first two the last remains to us in sterling physical and mental integrity and may honor us by his presence at this meeting. Last year on the occasion of his transfer to honorary fellowship the society signalized its affection for him and appreciation for his services to it by sending him a very handsome tribute in the form of a well prepared letter signed by each Fellow in attendance.

In a study of the history of gynecology in America one is thrilled with pride by the remarkable strength of character portrayed by the early workers. McDowell, Nathan Smith, Peaslee, the Atlees, Dunlap and others passed triumphantly through the fiery furnace of scorn, hatred and slander of communities, and even of their professional colleagues in their efforts to create a legitimate position in medicine for the surgical removal of large ovarian tumors. In Reeves' memorial of Dunlap he mentions the rebuffs the latter received from surgeons and even his college professor. Dunlap states regarding his first operation: "With a great deal of labor and care I prepared a report of the case for a Cincinnati medical journal the editor of which was my old professor of *Materna Medica* in the Cincinnati Medical College, Dr. John B. Harrison. The editor returned the manuscript with a note explaining that his reason for not publishing it was that it would encourage an unjustifiable and murderous operation which had already been tried and condemned by the profession, both in this country and Europe." Another rebuff was from a noted surgeon who told him, "You ought not to be doing such things." The Atlees in Philadelphia were condemned as murderers and butchers for doing ovariectomy and not a surgeon in New York would defend this operation when Peaslee read his paper before the New York Academy of Medicine in 1864. Kimball of Lowell, Massachusetts (1855) and others were struggling similarly to secure recognition for the surgical removal of large uterine fibroids by the abdominal route.

The work and ingenuity of Sims in the treatment of vesicovaginal fistulae will ever serve as a stimulus for the disheartened struggling against formidable agencies in various and devious avenues of study of the mysteries of the living human body and the

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amelioration of its ailments. The work of his faithful pupil Bozeman in this sphere cannot but arouse admiration. Even Sims was not entirely uninfluenced by besetting disappointments and surgical failures for he was known to have become so disheartened in his work in the South that he sold his property and arranged to embark elsewhere upon a business career. Had not the New York clothing merchant violated his contract at this juncture most likely medicine would have been deprived of the aid of this wonderful man and the human family of the benefit of his medical researches. His prodigious mentality and great activity were again appropriated by our profession as by a providential intercession. Just why the master mind and hand of such a man cannot be spared to benefit mankind indefinitely is one of the unexplained mysteries of Nature.

The plastic work of the eldest Emmet and the great work of Thomas Polk and Fordyce Barker will always be appreciated. The plastic perineal surgery of J. Collins Warren the round ligament operations for the rectification of posterior uterine displacements associated with the names of Dudley Mann, Wylie Simpson, G. H. Noble, Andrews and others remain familiar to us all. Not to refer to Hodge, Parvin, Meigs and Oliver, Wendell Holmes were to slight obstetrics with its other great geniuses.

We must recall with American pride the impetus to urinary surgery given by Kelly, who popularized direct cystoscopy and ureteral and renal exploration by its aid as well as the advanced work of several Americans in the scientific treatment of urinary diseases. The work of Coffe and Baer invoked a great advance in the surgical treatment of uterine fibromata. C. I. Noble by his careful and laborious study into the complications and degenerations of these neoplasms rendered an invaluable service.

I have not mentioned these great men as comprising all the talent in obstetrics and gynecology for surely later years have not stinted us in furnishing us with wonderful skill working with precise methods and securing definite and undeniable results but rather honoring myself by claiming a cer-

tain relation ship with these great men. Boasting of the accomplishment of our professional progenitor and fellow worker may be pardonable.

Of the splendid work of the past gynecology has not neglected the great subject of cancer. This disease as it affects women is almost limited to their reproductive organs. The uterus is the organ most commonly invaded by it. Probably Wisnberg and Montagna were the first to recommend total hysterectomy for its eradication. Marshall in 1780 and Langenbeck in 1811 were the first to perform this operation though in their cases the uterus protruded from each patient. In 1814 Cutbush recommended hysterectomy by a special suprapubic method. In 1821 Sauter of Constance first performed vaginal hysterectomy for cancer of the uterus *in situ*. Recanuer in 1829 recommended a special plan of vaginal hysterectomy and the following year Delpech proposed a combined abdominal and vaginal procedure. To the lover of medical history it is interesting to read the comments upon these operations made by medical writers during the next few years. Blundell whose small book "Observations on Some of the More Important Diseases of Women" appearing in 1837, is particularly interesting. Little progress was made until January 30, 1878 when Freund began performing his radical abdominal operation after cauterizing the cervix or even amputating it when large. I cannot but yield to my sense of justice in passing and mention here that Freund employed as an essential feature of his procedure in 1878 the very position so well described in 1801 by Trendelenburg and that his since borne his name. It remained for our American gynecologist Emil Ries of Chicago to plan and recommend a very radical operation for cancer of the cervix which he succeeded in having performed in 1895 by the late Wertheim. Ries has been an indefatigable investigator of this affection and deserves great credit. Nor can we leave this subject without alluding to the inestimable original work in this affection that was done by John G. Clark and N. O. Wender at about the same time that Ries and Wertheim were beginning their work in Berlin.

The galvanocautery as employed by John Byrne Skene and many others following their advocacy of it has been most efficacious.

Of obstetrics one must speak with considerable reserve. The untrained obstetrician has been the weak spot in our preparedness. The famous teachers—Parvin Barker and others did not to a desirable extent impress our profession with the importance of this specialty. This, no doubt, was in part due to its being a heritage from the midwife who has striven to claim it as a possession. In later years an earnest effort has been made by a few very efficient teachers to secure to obstetrics a proper recognition. The vigorous propaganda by Williams has probably aroused the medical schools to an appreciation of the necessity for much better facilities for real teaching of obstetrics. From a course practically didactic with manikin demonstrations and no clinical work it has been transformed into one clinical as well as didactic. In the last few years clinical obstetrics has been a strong feature in the medical school curriculum. The requirements of the examining boards of the various states reflect the appreciation of necessity of better equipment for the practice of obstetrics and has been a very strong factor in the marked improvement in obstetric training.

A complaint of inefficient teaching of gynecology in the past may be made in full justice. Dealing with the diseases of the female genitalia has had an inherent delicacy which has deterred the teacher from bringing students in as close relation to gynecological patients as to those suffering from diseases of other parts of the body. I submit clinical work as viewed from the amphitheatre has little superiority over didactics and students must be brought in close touch with disease in order to study it to greatest advantage.

Of the child, abdominal surgery we may well say it remains at home with its parents. For surely it was brought into existence by gynecology and obstetrics. When we recall the fearless abdominal surgery of Lawson Tait the cholecystotomy of J. Marion Sims, and the determined effort of the latter to establish prompt laparotomy with suture of the injured viscera as the accepted treat-

ment of gunshot injuries of the abdomen we at once see the relation of parent and child.

Even the first nephrectomies known to history (both fatal) that of Walcott, of Milwaukee June 4, 1861 and Spiegelberg in 1867 were done with the pre-operative diagnosis of ovarian or hepatic cyst. The first successful nephrectomy that of Simon in 1869 was done for a severed ureter complicating an ovariectomy. The genius Sims did the first cholecystotomy. Thomas operation of gastro-elytrotomy was a leader for more precise and better obstetrical abdominal surgery. Much has been written and timely regarding the unpleasant sequelae of laparotomies. A remarkably large proportion of patients whose abdomens had been invaded suffered from intraperitoneal adhesions, intestinal obstruction, fecal fistula, sloughing ligatures, and various other unfortunate conditions originating in the operations. This was such a sad commentary upon abdominal surgery that it acted as an obstruction to the rapidity of growth of the justifiability of this variety of surgery. So much for abdominal surgery as placed upon a sound basis by gynecology and obstetrics.

As yet the general surgeon had little to do with abdominal surgery. Nor was his attention directed practically to it until the specialists mentioned had ripened and prominently and enthusiastically praised this great field of surgery. Its early days without general anesthesia or asepsis must be reviewed by us with shuddering amazement. Many of us have seen it without the latter when it seemed disheartening. To Crawford W. Long who like Sims, had been an obscure village physician and to the creators of clean surgery we owe no small obligation. It has been markedly developed during the last thirty-five years so that now no portion of the lower half of the torso has any unknown parts. Even the suprarenal body is being resected for quite definite indications.

It would be unpardonable not to give due credit to bacteriology for its powerful aid in arriving at the intelligent treatment of infections found in the pelvis and the abdomen. One is led to wonder at the lateness of this correlation of bacteriology with gynecic and

abdominal surgery. Even as late as December 1879 in a debate in which many of the leading surgeons of London participated Mr Timothy Holmes was able to say: "No convincing proof of the germ theory as applied to living tissue and living phenomena has as far as I know yet been offered." It was not until 1881 that the observations of Ogston on the relations of micro-organisms to surgical diseases were published. And not until the publication of Rosenbach in 1884, and of Passet in 1885 were the varieties and natural history of the common organisms of suppuration fully described and their identity established. These had to be preceded by the epoch making researches of Koch on staining methods and culture media. Since then this branch of medicine has attained by wonderful strides a position of vast importance in the three great fields of medicine under consideration.

During the forty years existence of this society there have been times when it has seemed the problems of gynecology and obstetrics were practically all solved that nothing new was to be learned and that solely practical application of known facts was to be their future. This was indeed a gloomy view for the generation that marks no advance over the work of the preceding one is practically dead. In the field of investigation of the better cementing of the brotherhood of man and of the uplifting of the human family—in all these—advances must be constant. In fact the very existence of such specialties was thought to be jeopardized. The mechanical part of gynecology surgery was being largely taken up by the general surgeon who giving little heed to the real foundation of gynecology—that of the study of womankind—perhaps thought that operations constituted the whole field of this branch of medicine. The family physician entering the practice of his profession very poorly trained in the science and practice of obstetrics soon secured a rather large obstetric clientele absolutely by propinquity. He promptly learned that women served in time of such suffering were deeply appreciative and retained his services for other professional necessities. Such conditions

naturally lent themselves to the creation in many minds even in some great one of distinct fear of extinction of these two great sister specialties in our science. And yet the jeopardy was more threatening from other directions. Uninformed clouds passed in review. In many medical colleges gynecology no longer regarded as an important peculiarity was obliged to a unimportant rôle in the work of the chair of surgery. In others it was combined with bacteriology in one chair. While recognizing both peculiarities this plan robbed both of their dignity and prestige.

Another effort to terminate the extinction of at least one of these branches of science was that of the section on surgery of the American Medical Association at a meeting a few years ago to have its sphere extended to include gynecology and abdominal surgery. It failed however and at a subsequent meeting of the association abdominal surgery was added to the work of the section on obstetrics and diseases of women. I understand an amicable adjustment has been made putting abdominal surgery in both of the sections mentioned. The situation of gynecology and obstetrics may now be regarded as stable. I believe no fear need exist of loss of recognition of either. Both are very healthy adults and not to be regarded as infant industries needing fostering care. No distinct pause in their development has occurred since the organization of this society. The training of the medical student in gynecology is on a splendid plane. The graduating student is far more proficient in gynecology today than was the general physician of several years experience a short time since. The carefully prepared case histories—prepared by students under efficient supervision—the thorough laboratory investigations and opportunity for carefully supervised physical examinations bring the students to a basis for logical diagnosis—the paramount necessity for correct treatment. The clinical teacher who frequently states something is wrong in this abdomen and I will open it and then make the diagnosis endangers his reputation.

In the teaching institutions the same plan

of instruction in obstetrics obtains to a considerable degree. Both obstetrics and gynecology are gaining in this respect and while we do not expect marvelously rapid transformation in such matters owing to the marked changes in hospital construction and régime necessary thereto nevertheless a sense of pleasure has come to the teachers in these branches of medicine from the progress of the last few years.

In abdominal surgery the dread of dire results from sepsis ignorance shock hemorrhage and several other former causes of needless mortality has nearly vanished. While problems in this field of endeavor remain unsolved, diseases of the abdomen are much better understood than formerly. Various aids are now being employed to assist in the diagnosis or treatment of pelvic and abdominal diseases and I dare say they will have notable extensions. The roentgen ray has greatly assisted in the discovery and location of adhesions, neoplasms, ulcers and stases of the stomach and intestine determining the presence or absence of biliary renal, and ureteral calculi and indeed with the ureteral catheter is an extremely reliable agent for determining whether urinary calculi above the bladder exist. We are justified in believing it will prove of great value in diagnosing pregnancy and various abdominal and pelvic tumors. Laboratory findings in huetic and Neisserian tubercular and other infections though of great importance, must and will assume a still greater rôle in our agencies. I feel sure that even improvements will be made in more careful investigation of patients histories to determine the time for operation as well as in the technique to be followed. Already the surgeon is cautious in radically invading infectious areas often delaying with advantage when the less skillful would fairly plunge into a surgical operation. F. F. Simpson has recommended marked delay even months, for radical operations in infections in and about the uterine appendages. The value of this plan can scarcely be questioned and its universal acceptance may be expected in the treatment of patients who can afford the extra time this requires. It is another feature in the conservative

practice that goes with greater knowledge. In ectopic pregnancy his advocacy of delayed operation has been quite universally heeded.

The subject of displacement of the uterus from time immemorial has been a fruitful one for lively and even bitter discussion. Careful study of the forces maintaining the position of that organ are gradually lessening the differences of the past in this respect and we may reasonably hope for full accord in it. Pelvic non puerperal infections are steadily losing their terrors and we may look for them to be practically removed from the class of highly dangerous diseases. This will be largely due to the recognition of the superiority of dependent drainage and conservation in their radical treatment.

The treatment of cancer of the uterine cervix continues to receive the very earnest attention of gynecologists and special activity in the general subject of cancer during the past three years has been enthusiastically aided by this society. Thus far the cause of cancer has not been found and no doubt this must be discovered before we may reasonably expect to gain a mastery over this dreadful disease. Its behavior as influenced by radium and long-continued, slightly elevated temperature as advocated by Percy is of interest. The use of certain rays from radium seems to retard its progress and perhaps completely destroy it while other rays from it are thought to induce the disease. If the latter be a fact we may well refuse to believe, for the present that cancer is of microbic nature. Even the Percy method emphasizes this doubt for it should stimulate microbic activity yet its retarding influence on the progress of cancer of the cervix is attested by many careful and reliable observers. But neither of these two agents can be regarded as a specific for this disease for they are both notably limited in their radius of action. Whether radium has deeper penetrating power as a cancer destroyer than the Percy heating method is a matter of doubt and the cases reported by Boldt throw grave doubt on the penetrating power of Percy's method used for this purpose. This latter method is based upon the application of a low elevation of heat to the involved tissues. And yet

for this purpose is employed an instrument so hot that it has constantly to be moved to prevent overheating and the heat is gauged principally by the sense of touch through the uterine wall which varies greatly in individuals. If this method is proved a specific against the active agent of cancer is it not to be the sole agency in the treatment and cure of cancer in the breast bladder vagina vulva and rectum? If it has a positive specificity for two inches then no part of the human body will be inaccessible to its beneficent influence.

It would appear then that our hope in cancer of the uterus continues to consist of surgery as early as possible universal education on this subject the employment of radium and high or higher temperatures and unremitting search for the true etiology of it. Radium offers benefit to other forms of neoplasms particularly to the bleeding uterine fibroid according to several credible observers. Nevertheless it is yet but an empiric agent not available to more than a very small percentage of patients suffering from the many conditions in which it is extolled and not without its evil effects such as corrosion of tissue. While we may believe enthusiastic faith has had much far too much to do with the reported results of radium application we cannot fail to recognize that this agency when properly harnessed has great possibilities in the treatment of pathological conditions. I believe it is deserving of being absolutely divorced from charlatanism and commercialism. Its exploitation has been unfortunate.

In obstetrics a nearly parallel situation is found in the attitude and sympathy several prominent workers and teachers have afforded the unsational use of the various alkaloids of hyoscyamus and opium under the alluring name of twilight sleep. In the sweeping march over the continents of this dangerous method the professional and moral fibers of even the flower of the obstetric world have been challenged. It has nearly equaled the tales of the French revolution. It is believed the danger of this awful flood has passed and the conscientious and competent obstetrician may now come down from his

Mount Ararat and pursue the even tenor of his way. Probably humanity has been benefited by this visitation only to the extent that it has prompted us to take stock of our methods and even of our humaneness and has appealed perhaps not unnecessarily to still greater concern for the suffering of our patients. The outcome of this superior substitutes for opium and hyoscyamus are now employed. Probably the open mind is now predicting that at no distant date twilight sleep will rarely be recalled to memory and nitrous oxide and oxygen inhalation during labor will be given an enduring place in the obstetric régime.

It is highly probable that cesarean section will be given a wider field of application. The vulnerability of tissues of women certainly of American women will be fully recognized and they will not be subjected to unreasonable and unbearable obstetric strain and avoidable infant mortality. Much greater advance in teaching obstetrics may be expected than has been obtained. Largely to J. Whitridge Williams should we attribute such improvement.

In abdominal and pelvic surgery at its present stage of development probably no more important matter is before us than the prevention and correction of interperitoneal adhesions. A propaganda on this subject should result in untold lessening of human suffering. Very likely an active educational campaign would greatly lessen the evil of post-operative adhesions. The finding of large areas of adhesions in the abdomens of patients who have been previously subjected to laparotomy for simple or clean conditions is far too common to escape the attention of the careful abdominal surgeon. Nor is it always the tyro that unnecessarily violates the parietal and visceral peritoneum by undue handling suturing etc. Various materials have been extolled as prophylactics against post operative adhesions. I will not tax your time by enumerating them but will refer to a few of them. Vaseline highly regarded by some of America's greatest abdominal surgeons I feel I must severely criticize. One to three years after I had smeared it over denuded peritoneal area I have re-

moved from the abdomens of patients encysted masses of vaseline having diameters up to one inch and have found adhesions were very extensive. In some places these capsules of vaseline formed a dense rigid connecting structure between several loops of intestines. Acting upon the theory that

before a fibrous exudate can form in the peritoneal cavity with its resultant plastic agglutination there must be the liberation of that hypothetical ferment, thrombokinnase its activation of prothrombin in the presence of calcium and the production of thrombin Saxon Pope experimented on sixty rabbits and published his work in January 1914. These experiments were made with many different materials and he concluded from this work that a solution of 2 per cent sodium citrate in a 2 per cent solution of sodium chloride was the best remedy. His faith in his conclusions is proved by his reporting in February 1916 the results of the employment of this hypertonic solution in 400 abdominal operations in the University of California Hospital. Walker and Ferguson, doing 104 operations on 63 rabbits, found 3 per cent of the citrate in 2 per cent of sodium chloride solution was the most satisfactory giving complete success in 70.5 per cent and 88.2 per cent partial success. Certainly such results merit our attention. In the presence of sepsis or deep or wide destruction of tissue it is not claimed these hypertonic solutions can be regarded as infallible but even here they are of use. In my personal experiences with the 3 per cent solution of the citrate in quantities of 200 to 300 cubic centimeters considerable shock has been noted. Among the questions that arise in our minds are

1. If it gives absolute success in .05 per cent in mild peritoneal traumatism can its use be extended to success in such severe peritoneal injuries as separated adhesions?
2. How long must it be in contact with the area to be of highest efficiency?
3. What is the duration of its activity?
4. Can it be used efficiently in gauze covering large areas of peritoneal denuda-

tions and brought out through the abdominal wall?

If these questions are to be later answered satisfactorily to us then we will have positively mastered this much dreaded and dangerous complication — peritoneal adhesions.

Coffey has recently invited attention to his rubber pessoidam brought through the abdominal opening used in separating pelvic adhesions in a ute attacks of adnexal infections. Though he specifically claims no hernia fell was this prolonged abdominal drainage I fear that claim will not tempt many to use this method of dealing with such conditions. I believe the paraffin-stearic gauze recommended by Fisher used as a drainage material for pelvic adhesions and conducted through the vagina will be found very satisfactory. While I have not attempted to be a seer yet I have been so impressed by some of these efforts to lessen the dreadful peritoneal adhesions that I have been emboldened to risk tiring you with this rehearsal.

We are at great loss for lack of knowledge of the influence of luetic infection on the pathological conditions we as specialists must treat. In the past the degree of precision in diagnosis of this variety of infection has been so slight that we have not been able to associate with it observed lesions to the degree of certainty that the Wassermann reaction now permits. The routine blood examination reveals a startling frequency amounting almost to regularity of the positive Wassermann which quite reliably indicates the presence of lues. It is to be hoped the attention given to this subject at this meeting of our society will have the much needed stimulating influence on the profession in general necessary to a due appreciation of the momentous importance of recognition of lues in obstetrics and gynecology.

Surely there are very many grave problems to be solved in the fields of endeavor you represent but I am unboundedly confident this society will in the future maintain in that work the prestige that has come from the high character of work it has performed.

EPILOITIS FOLLOWING HERNIOTOMY

BY WILLIAM HESSERT M.D. F.A.C.S. CHICAGO

DISEASES of the omentum are relatively uncommon and literature on the subject is scant, especially in the English language. Omental diseases are either tumors or inflammations. The former include carcinoma, sarcoma, lymphangioma, cyst, and teratomata. The inflammations are divided into two groups which include first the cases that occur post-operatively and second those not preceded by operation. Herniotomy is the operation most frequently concerned in the first group and since ligation of the omentum is done in only a small minority of hernia operations it follows that epiploitis as a complication is likely to be uncommon. Some operators with large experience in hernia work have never encountered it.

The most recent publication on the subject of inflammatory tumor of the omentum is by L. Feterhanwahr.¹ This author has collected 44 cases, 36 of which had been preceded by operation, mostly herniotomies. Lucas Championnière observed two cases of epiploitis among 275 operations for hernia. Duboi² one in 300 cases and Tuffier³ one in 600 cases.

The French literature contains the first reference to this subject in 1892 by Lucien Championnière followed by Reynier in 1893, Forge in 1896 and later by Boeckel, Meniere, Morestin, Le Dentu and others. Schnitzler's article in 1900 was the first to appear in German. Cumston and Humann are among the few who have written on the subject in this country.

American writers on hernia scarcely mention the possibility of epiploitis following ligation of the omentum. While it is true that epiploitis is a rare complication in this country due to the general use of absorbable ligature material yet the matter is of more than academic interest and should be familiar to every surgeon. The fact that two cases occurred within a short period in the writer's

practice suggests the belief that more cases would be diagnosed were there a better understanding of the subject.

The case histories which follow illustrate the acute and chronic type of this disease.

CASE 1. A young man had been operated upon for a moderate sized inguinal hernia. A large piece of omentum was mobilized and used in heavy pack of iodine gauze. The patient progressed normally for about eight days but then the wound healed slowly with infection. Then the patient developed epiploitis and complained of abdominal pain on the left side. Nausea and vomiting ensued, the illness became febrile and the bowels failed to respond. The abdominal pain became general and all the symptoms were intensified. When on the nineteenth twelfth day of the disease the condition of the patient was desperate. He presented the typical picture of general peritonitis and it was impossible to determine whether any relation existed between the peritonitis and the pre-linguinal hernia.

The abdomen was immediately opened by means of a left rectus incision on a level with the umbilicus. The peritoneal cavity was full of pus under high tension, the fluid was turbid and flaky and the bowels were covered with exudate. The ligated pedicle of the omentum was found in the upper left quadrant of the abdomen. It was about the size of a lemon covered by exudate and saturated with pus. The adhesions to the abdominal wall were easily separated and it was seen that the tumor was loosely attached to the transverse colon. The catgut ligature was still intact. A hurried examination revealed no lesion of bowels, bladder or other organs. Nothing was done further than drain but the patient died twenty-four hours after.

This infection of the peritoneal cavity could have been introduced in no other way than by the retracting omental stump. The omentum became contaminated during the progress of the operation and the pedicle proved a favorable medium for bacterial growth. The catgut was not at fault, for the same material was employed in the repair of the hernia which healed *per primam*.

CASE 2. A man 40 years of age had a large right inguinal hernia which was operated on and a large piece of omentum was removed by the aid of several catgut ligatures. The wound healed without infection and the patient left the hospital at the end

of two weeks. After a free interval of about two weeks he began to suffer vague abdominal pains. Two weeks later he consulted the writer and complained of general malaise, anorexia, constipation, pains on the right side of the abdomen and swelling about the level of the navel.

Examination of the site of operation was negative—the hernia had healed perfectly. The abdomen was slightly distended, and the muscles on the right side were somewhat rigid. To the right of the umbilicus a mass could be felt which was about four inches in diameter and fairly well circumscribed. It was sensitive to pressure, and did not move with respiration. There was dullness, almost flatness, on percussion but a zone of tympany separated this area from the liver.

There was nothing about the findings to suggest involvement of the liver or kidney and the mass was rather higher up in the abdomen than the ordinary appendiceal abscess. There was an evening rise of temperature to 100 and a leucocyte count of 10,000. The urine was negative and further physical examination was negative. These findings in the history should have suggested the diagnosis.

The abdomen was opened through a right rectus incision directly over the tumor which was found adherent to the abdominal wall. The adhesions could be readily separated and the mass freed from the wall and underlying bowels. Upon delivery the mass was found to consist of inflamed omental tissue. Almost all that was left of the omentum was involved, there remaining only a small bridge of healthy tissue where it was attached to the transverse colon. This was fortunate, for it permitted easy ligation and removal of the whole tumor. The inguinal region was found on examination from the inside to be perfectly normal. The patient recovered from the operation and remained well.

The tissue removed was hard and dense, being composed of fibrous and fatty tissue, with preponderance of the former. In the center of the mass several small abscesses were discovered from which *staphylococcus aureus* was grown. No trace of the ligatures could be discovered. This case illustrates the most commonly observed type of epiploitis, namely the subacute variety. It differs only from the ordinary in that catgut was used instead of the more notorious offender—silk. While the number of the reported cases has recovered spontaneously the findings in this case preclude the possibility of recovery without operation.

A number of types or varieties of epiploitis are described by various authors, but the classification of Peterhanwahr seems to be the best.

1. Post operative variety. (a) Simple inflammatory, hyperplastic type. (b) Suppurative epiploitis.

2. Extension from neighboring organs, not following operation.

Sauget describes three varieties as follows: (a) Epiploitis plastica simplex. (b) Epiploitis plastica with adhesion. (c) Epiploitis purulenta.

The variety most commonly observed is the simple inflammatory or hyperplastic. The free interval after operation before the onset of symptoms is variously reported at five days to three years. In the majority of cases however it will average three to four weeks.

The type of inflammation which develops in the given case depends upon the virulence of the infection or the degree of mechanical irritation. In the very acute cases, of which an example is reported in this paper, the acutely inflamed omentum is but part of a general peritonitis. As the process becomes more chronic the inflammatory products become more organized and fibrous. The mass may look like a fibrolipoma and on section one or more abscesses are usually found with the ligature as a nucleus. Adhesions to the abdominal wall are most constant, and at times large abscesses have developed which were opened by the surgeon or gained a spontaneous exit. Sinuses have formed and persisted due to the presence of masses of silk.

There remains finally to be mentioned the slowly growing chronic form which so much resembles a malignant tumor that diagnostic errors are almost inevitable. The structure of the mass is so dense and fibrous that this together with the absence of pus simulates the gross appearance of malignancy closely. It is the opinion of many that the mechanical irritation alone of the silk without any accompanying infection, is capable of developing the large fibrous growths which have been encountered.

The factors primarily involved in the development of epiploitis are the following:

1. The ligature material.
2. The manner of ligation.
3. The condition of the omentum at the point of ligation.
4. Infection.

1. *The ligature material.* In about 90 per cent of the reported cases the material used was heavy silk (Reynier, Monod).

(Guinard Braun) In a small percentage of the cases other material such as catgut or kangaroo tendon was employed. Silk alone without added infection has been known to stimulate the development of enormous fibrous masses. This is explained by Hollander on the theory that while the ligature may have been drawn tightly enough on the pedicle to secure hemostasis it did not produce necrosis and this bit of living tissue in the stump was stirred into tumor like growth by the irritation of the silk. I am inclined to the belief that there is an element of infection in all of these cases. Virulent infection will result in any of the acute types of sepsis while a mild infection may eventually become sterile or result in sinus formation. Such sinuses will not close until the offending silk is eliminated. Absorbable ligatures when infected provoke the same disastrous results as silk. The absorbability of the material when sterile precludes the possibility of any late irritative effect.

2. *The manner of ligation* has much to do with the occurrence of epiploitis. The case records show with few exceptions that the omentum was ligated either *en masse* or with a figure-of-eight ligature. This bunching of the omentum into one ligature has been a fruitful source of trouble.

3. *The condition of the omentum at the point of ligation* has had much to do in contributing to a bad result. Thus if section is made through diseased tissue the result of chronic inflammation as is so frequently observed on old or incarcerated hernias the retracted pedicle becomes a source of trouble. Reynier, Roche, Boeckel and others report cases of this kind in which silk was used.

4. *Infection.* It seems probable that infection is the most important factor acting either alone or in conjunction with any of the other predisposing causes. That the irritation which results in the formation of large tumor like masses is entirely mechanical is open to question. How often do we see silk when sterile heal in the tissues without causing any reaction whatever. When large fibrous masses develop we have bacterial irritation added to the stimulus of the foreign body the silk ligature. It is conceivable

that a low grade of infection after producing its effect might become sterile and culture taken from the silk would show no growth thus lending support to the mechanical theory.

SYMPTOM

In the very acute cases the symptoms arise a few days after peritonitis and consist of the usual signs of intra-abdominal infection within the abdomen ending with general suppurative peritonitis. In rare instances the process may become localized with abscess formation.

By far the majority of the cases run a subacute or chronic course lasting for months or even years. The time interval after operation is generally of four to eight weeks duration but cases are on record in which two to three years elapsed before the onset of symptoms.

Pain is one of the first and most constant symptoms. It may at first be in any portion of the abdomen depending on the location of the inflammation. Frequently it is in the upper abdomen and is aggravated by deep breathing, coughing, or tight clothing. Associated with the pain there is usually a rise of temperature with all its attending symptoms. There may be an absence of signs pointing to any special organ and in some cases the symptoms all subside and the patient gradually makes a spontaneous recovery. More often the disease continues progressive with finally all the signs of a localized abscess in the abdomen manifest. The pus in such cases may rupture into the bowel or succeed in burrowing through the abdominal wall.

In the type of cases that develop slowly and insidiously with vague and ill-defined symptoms there is great resemblance to the clinical course of a cancer. The presence of a palpable mass is further suggestive of malignancy. In doubtful cases the abdomen has been opened and even then the operator is in doubt whether the tumor is a carcinoma, sarcoma or of inflammatory origin.

DIAGNOSIS

In every case of a herniotomy where abdominal symptoms supervene the possibility of epiploitis must be considered. It is very likely that there have been many cases which

have not been recognized or have been incorrectly interpreted because epiploitis in this connection has received but little attention. Diagnosis is suggested by the occurrence of pain associated with the development of a mass in the abdomen. The tumor is usually on the same side as the herniotomy on a level with or above the umbilicus. The tumor has been but rarely seen in the pelvis or inguinal region. The tumor varies in size but has been known to grow very large. It is tender on palpation and is usually fixed to the abdominal wall so that it does not move with respiration. There is usually dullness or flatness on percussion as the intestines are beneath the mass.

In differential diagnosis one must consider cholecystitis, subacute appendicitis, chronic perforation of the stomach, foreign body (such as a gauze sponge), diverticulitis of the sigmoid and pancreatitis.

TREATMENT

According to Braun the development of an inflammatory tumor of the omentum after herniotomy does not necessarily demand operation for a fair proportion of such cases recovers under expectant treatment. It is fair to assume, however, that the diagnosis in some of the recovered cases might be open to some question.

The most radical view relative to treatment was expressed by Reynier, one of the early writers, who advised extirpation of the tumor as though it were malignant.

The practical lesson to be learned is that we should be familiar with epiploitis, as it may complicate recovery after a herniotomy and adopt the measures necessary for prevention. These are in fact elementary and include first a faultless operative technique, both aseptic and mechanical. There should, above all, be an avoidance of rough handling of tissues. Portions of the omentum should not be removed at all during the performance of a hernia operation unless there is a valid indication. If resection must be made, then absorbable suture material of as small a size as possible should be employed. The vessels in the omentum should be tied with many fine ligatures, and the use of *en masse* or

figure-of-eight ligatures should not be considered. Section should always be made through healthy omental tissue, never allowing any diseased tissue to slip back into the abdominal cavity.

After the diagnosis of epiploitis has been made the decision for operative interference rests with the judgment of the surgeon. The acuteness of the symptoms and the progress of the disease would be determining factors. Under ordinary conditions no harm can follow an exploratory incision. It is best to remove the inflammatory mass completely if possible. If owing to adhesions and abscess formation, removal is impossible then there should be thorough drainage.

In the event of intestinal obstruction caused by an ill-tubrous inflammatory mass, it may be necessary to resect or shortcircuit the bowel.

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THE TRANSPLANTATION OF THE ARTICULAR END OF BONE INCLUDING THE EPIPHYSEAL CARTILAGE LINE

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IN a previous paper entitled "The Experimental Transplantation of the Epiphysis" the effect of transplantation on the longitudinal growth of bone has been considered by the author (1). The results of those experiments show that the longitudinal growth ceases after transplantation of the epiphyseal cartilage line whether by itself or with a neighboring piece of epiphyseal or diaphyseal bone. In the present article a description of the macroscopic and microscopic changes occurring in the various components of such a transplant will be given.

Thus it becomes necessary to consider the changes occurring in the articular cartilage, the marrow and the trabeculae of the epiphysis, the epiphyseal cartilage line, the marrow and the trabeculae of the diaphysis and the cortical bone. Normally there are certain constructive and destructive changes taking place in a growing bone but with the additional influences of transplantation the complexity of the study is considerably increased.

In order to understand clearly the changes that take place it will be advisable to describe minutely the structure of the epiphyseal end of a growing and developing bone because certain terms not given in the usual histological descriptions are employed in the text and also because it is necessary to express in definite defining terms what is understood as epiphysis, epiphyseal cartilage line and metaphysis which are so often very loosely employed.

Normal epiphysis. In the very early periods of bone development the epiphysis is entirely cartilaginous. With the appearance of the center of ossification there is a gradual disappearance of the cartilage until only a shell remains surrounding the cancellous epiphyseal bone and marrow (Fig. 7). The cartilage at one end persists to form the articular cartilage while that at the inner

boundary forms a part of the epiphyseal cartilage line. The part of the epiphyseal line toward the epiphysis will be designated as the epiphyseal ossifying cartilaginous layer (Fig. 1). It consists of hyaline cartilage with irregularly scattered nuclei and from its epiphyseal side ossifying buds of cartilage extend into the epiphysis. In the older animal the part of the shell of cartilage connecting the articular cartilage with the epiphyseal cartilage line undergoes complete ossification so that the articular cartilage is no longer found to be inserted into the epiphyseal line. The remainder of the epiphyseal cartilage line is composed of columns of cartilage-cells, the nuclei of which are flat and heavily stained near the epiphyseal ossifying cartilage layer but gradually become round and larger on nearing the metaphysis until they finally are of a vesicular structure with a surrounding light staining protoplasm. These large vesicular cells form the boundary between the epiphysis and the metaphysis and finally become a part of the latter. It is by the proliferation of the cartilage-cells of the epiphyseal cartilage line that the longitudinal growth of bone is maintained. The exact process of this procedure will not be considered at present.

Normal metaphysis. The metaphysis is made up of osteoid tissue in which there are numerous vascular loops. Extending into the diaphysis are long irregular columns of cartilaginous matrix which are in various stages of ossification, from partial at their beginning in the metaphysis to complete at their ending in the diaphysis. This will be designated as the metaphyseal ossifying cartilaginous layer (Fig. 1). There is a rich vascular marrow between these columns of ossifying cartilage.

The material for this report was obtained from seventy-five experiments on dogs, mostly in the early growing period. All of the opera-

tions were performed under general ether anesthesia during which the usual aseptic measures were employed. At the conclusion of the experiment the foot was protected by a light plaster-of-Paris dressing which was allowed to remain from fourteen to twenty-one days, the animal in the meantime having full freedom. At the conclusion of the experiment all of the metacarpal and metatarsal bones were measured in order to determine the amount of growth. From a large series of measurements in normal animals it was found that the two central bones of the metacarpal or metatarsal region of the same and of the opposite side, are all practically of equal length (Fig. 2). This affords a standard of comparison and allows an easy method of determining the amount of actual growth. As the metacarpals and metatarsals possess but one epiphysis situated at the distal end of the bone any change in growth that takes place can only be caused by proliferation from that particular epiphyseal cartilage line.

Röntgenograms were taken of the feet in many instances. Part of the specimen was preserved in Kaiserling's solution and part used for microscopical study. The tissue for microscopical examination was fixed in Orth's fluid embedded in celloidin and the cut sections stained with hematoxylin and eosin or Van Gieson's stain. Fifty-eight of the more important experiments are described in detail.

REIMPLANTATION OF EPIPHYSEAL CARTILAGE LINE

Method. The distal end of the bone is exposed until the epiphyseal cartilage line is visible. By means of a sharp scalpel a cross section of the bone in the region of the epiphyseal cartilage line including an adjoining piece of the diaphysis and the epiphysis is excised and immediately reimplanted. The width of such a section is about 0.4 cm. The piece is anchored in place by an X-shaped suture over the dorsal surface and the wound closed in layers. At the termination of the experiment the animal is killed by means of gas.

Experiment 1. Duration 4 days. Dog 24 14
age 3 months.

In this experiment the distal part of the bone is reimplanted.

Macroscopical description. The healing is normal. There is no growth of either normal or operated bones. The reimplanted segment is in contact with the host at its distal but not at its proximal end.

Microscopical description. The articular cartilage appears normal. The marrow of the epiphysis shows definite evidence of degeneration in both the reimplanted piece and in the host. The trabeculae of the epiphysis show uniform failure of staining of the bone-corpuscles and appear to be undergoing early degeneration. The epiphyseal cartilage line presents a rather normal appearance aside from increase in width. The metaphysis shows a normal arrangement of the ossifying cartilage columns but there is some lack of nuclear staining. The intervening marrow is necrotic. The marrow of the diaphyseal part of the transplanted segment is undergoing necrosis. The nuclei of the trabeculae of the diaphysis stain faintly and appear to be degenerating. The small amount of cortex of the transplant is lacking in clear staining. The elements of the host appear normal throughout.

Experiment 2. Duration 3 days. Dog 3 36
age 3 months.

Macroscopical description. The healing is normal. There is no growth of the normal or the operated bone but there is a considerable thickening in the region of the implanted cartilage.

Microscopical description. The articular cartilage became displaced following the operation so that the outer surface is turned inward allowing a normal penetration of fibrous tissue into the articular cartilage. The marrow of the epiphysis with the exception of a small area on the dorsal side near the epiphyseal cartilage line is replaced by young connective tissue in which are some fat cells. The trabeculae of the epiphysis are for the greater part made up of a homogeneous non-cellular tissue. Some of the trabeculae especially near the epiphyseal cartilage line on the dorsal surface, begin to show proliferation of new osseous tissue about their periphery. The epiphyseal cartilage line is markedly changed; only a band of cartilaginous tissue remains, which corresponds to the epiphyseal ossifying cartilage layer. The cartilage columns are entirely replaced by fibrous and vascular tissue. The metaphyseal ossifying cartilaginous zone is replaced by newly formed osteoid tissue. In the diaphyseal marrow there is a slight increase of polymorphous nuclear cells. The trabeculae and cortex has a normal appearance.

Experiment 3. Duration 3 days. Dog 23 3L,
age 4 months.

Macroscopical description. Good healing is present. The growth of the operated bone is 2 cm. while the normal is 0.4 cm. The articular cartilage appears smooth and the marrow of the epiphysis is fairly normal. The epiphyseal cartilage line is thickened. There is a whitish streak in the distal part of the line and a broad band of white tissue in the region of the metaphysis. The li ca

of union are still distinct. The remainder of the bone appears normal.

Microscopical description. The articular cartilage is normal in appearance a little from a light fibrous deposit on the outer layer of the perichondrium. The marrow of the epiphysis distal to the transplant is of normal appearance while that of the transplant is necrotic and fibrous except for a small area on the distal side near the epiphyseal cartilage line. The trabeculae of the epiphysis show a considerable amount of osteoporosis in relation about the homogeneous central part (fig. 3). The epiphyseal cartilage line is almost double the normal width. A distinct line of lag is seen in the row of columnar cartilage which divides them transversely into a proximal two-thirds and a distal one-third. This line corresponds to the white streak mentioned in the gross description. The cells of the epiphyseal cartilage have a normal structure with the exception of those near the line of cleavage. The cartilage columns are elongated and appear to be increasing in length. The metaphyseal ossifying cartilage columns are elongated. The marrow of the diaphyseal part of the transplant is necrotic and fibrous while that of the host is normal. The trabeculae of the diaphysis show new osseous tissue on their borders. The cortex of the host presents an active periosteal new bone formation near the line of union. At one place on the outer border of the cortex there is a node of osseous and cartilaginous material in which we can plainly see the proliferation of the periosteum to form new bone. This outgrowth is most likely associated with an injury to the periosteum during the operation.

Experiment 14. Duration 44 days. Dog 33 44L age 6 months.

Macroscopical description. There is good healing. The operated bone is lengthened 0.5 cm while the normal bone is increased 0.7 cm (fig. 4). The line of union cannot be distinguished. The bone is swollen in the region of the implanted cartilage line. The epiphyseal cartilage line is irregular being quite narrow at the center and proximal to it in the metaphyseal region is a white streak which appears to be degenerated tissue.

Microscopical description. Upon the surface of the articular cartilage there is a layer of fibrous tissue. Its inner layers appear quite irregular and there is a penetration of fibrous tissue into its substance. These changes in the articular cartilage are most likely due to trauma at the time of operation. The marrow of the epiphysis appears normal. The majority of the trabeculae are entirely regenerated except the central part of some which when by their poor staining at that point. The epiphyseal cartilage line is very irregular being quite narrow at the center and normal width at the sides. The peripheral part appears fairly normal although the cartilage columns are curved and bow beginning large and hanging. In the middle there is an entire absence of fibrous columns which are replaced by fibrous and osseous tissue. The meta-

physeal region is entirely replaced by osseous trabeculae. The remainder of the transplant and host appear normal.

Experiment 15. Duration 35 days. Dog 35-6R age 4 months.

Macroscopical description. The healing is normal. The operated bone is only a little smaller than the time of operation while the non-operated bone is 1.0 cm longer than before. The joint with the articular cartilage appears fairly normal with the exception that the cartilage is a little thinner. The entire epiphysis appears larger than normal. The bone is longitudinally sectioned after 1 hour and there is still a small remnant of the epiphyseal cartilage line. The roentgen ray shows the line but the bony continuity in the normal hosts makes it more likely that it is persistent cartilage at the line of union.

Microscopical description. The joint cartilage, the trabeculae and marrow of the epiphysis are of normal appearance. The epiphyseal cartilage line is entirely lacking though leaving only a small remnant of irregularly arranged cartilage and fibrous tissue in the line of union. The remainder of the transplant and host appears normal.

Conclusion on Reimplantation of the Epiphyseal Cartilage Line

In general the changes are confined to the reimplanted tissues. The earliest changes are seen in the marrow tissue where there appears to be a necrosis of the greater part even as early as the fourth day. The marrow spaces at 14 and 21 days are filled with a fibrous connective tissue but at a later period a further differentiation takes place and new marrow is formed. In these experiments on account of the close proximity of the normal tissues of the host it is impossible to determine the origin of the regenerated tissue.

The first evidence of degeneration of the epiphyseal cartilage line is seen at 23 days and appears as a cleavage line extending through the cartilage columns so as to divide it into a proximal two-thirds and a distal one-third. Later a progressive degeneration of the epiphyseal cartilage line occurs as is shown by the 44-day and 63-day experiment, there being almost a complete disappearance of the cartilage in the latter experiment.

The trabeculae undergo degenerative changes as early as 4 days and at 23 days there is regeneration from the periphery which is practically complete at 44 days.

The transplant heals in place so that at 44 days there is no evidence of the line of union.

AUTOTRANSPLANTATION OF THE EPIPHYSEAL CARTILAGE LINE

Method In this set of experiments a cross section of bone from the region of the epiphyseal cartilage line, including a piece of adjoining epiphyseal and diaphyseal bone is transferred to take the place of a similar section from a corresponding bone of the opposite foot.

Experiment 6 Duration 23 days Dog 3 3R, age 3½ months

Macroscopical description. There is good healing. The increase in length of the operated bone is 1 cm. while the normal bone is increased 0.6 cm. The bone is broader than the normal especially at the epiphyseal end. The articular cartilage is smooth. The lines of union are just visible. The epiphyseal cartilage line is rather irregular and has lost its normal gelatinous appearance. Just proximal to the epiphyseal cartilage line is a band of tissue of white color and the bone in that region is denser than normal.

Microscopical description. The articular cartilage is of normal structure except for a small defect at one place on the surface. The marrow of the non-transplanted part of the epiphysis is normal while that of the transplanted portion are poorly stained, especially toward their centers. The epiphyseal cartilage line is divided into a proximal two-thirds and distal one-third on account of the degeneration of the tissue in that region (Fig. 5). The parts on either side of the cleavage line present fairly normal appearance. The cartilage beneath the perichondrium is in a state of active development. In the metaphysis the provisional ossifying cartilage columns have a fibrous and necrotic change of the marrow. The line of union of the diaphysis is quite distinct especially near the periosteum where there is a considerable amount of callus. There is an increase of leucocytes in the diaphyseal marrow near the line of union.

Experiment 7 Duration 23 days Dog 3 3L, age 3 months

Macroscopical description. The appearance in general corresponds to that found in the previously described experiment. The normal bone has increased 0.4 cm. while the operated bone has only increased 0.1 cm. The epiphysis, however is denser. The epiphyseal cartilage line has not the same tendency to separate and the diaphyseal part of the transplant is less dense than normal.

Microscopical description. The articular carti-

lage shows some slight changes in the inner layers and there is fibrous deposit on the surface. The marrow of the epiphysis is composed of loose fibrous tissue, throughout which are scattered marrow elements both in the transplant and in the host. In the trabeculae there is marked proliferation about the periphery of the dead central portion. This applies to the trabeculae both in the transplant and to the part of the host near the line of union. The line of union in the epiphysis is fibrous in the center and articular in the sides. The epiphyseal cartilage line is broadened and shows a line of cleavage as in the previous case. There is considerable articular proliferation at the outer ends of the metaphysis in provisional ossifying cartilage columns resulting in osseous change. The intervening marrow is chiefly fibrous, only a few marrow elements being present. The elements of the host appear normal.

Experiments 6 and 7, which were performed on the same animal show some variation in the findings in spite of the fact that the duration of the experiment was the same in each case. It is possible that the discrepancy in the results was due to the fact that on the left side there was more injury to the vascular supply as an adjoining bone was operated upon at the same time and because the size of the two transplants is different, being 0.4 cm. wide on the right and 0.7 cm. on the left.

Experiment 8 Duration 55 days Dog 9-4 ad leucost

Macroscopical description. The healing is good. There is no growth in the normal or operated bone. The joint cartilage is of blue color and the epiphyseal cartilage line is absent. The marrow has a normal color.

Microscopical description. The articular cartilage appears normal. The marrow is mature being composed of fat and diffusely scattered cellular elements. The trabeculae are quite large and are made up of compact well-stained bone. The epiphyseal cartilage line has entirely disappeared so that the marrow of the diaphysis and the epiphysis merge into each other. The diaphysis is of normal appearance.

Experiment 9 Duration 89 days Dog 10-5, age 3 to 4 months

Macroscopical description. The length of the operated bone is 0.3 cm. less than normal, while the non-operated bone is 0.1 cm. longer. The marrow appears normal. The epiphyseal cartilage line cannot be distinguished.

Microscopical description. In the articular cartilage there is diffuse arrangement of cartilage cells of the inner layer but little evidence of degeneration. The marrow of the epiphysis is composed of fatty mature marrow. The trabeculae are normal. The epiphyseal cartilage line is entirely absent.

except for two small remnants of cartilage near the border. The diaphyseal marrow and trabeculae are similar to those of the epiphysis.

Exp 100 ml to Duration 1361 Day 3 - 30L ag 13 month

[illegible]

Microscopic description. The trabeculae are marked by fibrous thickening in the intertrabecular articular cartilage. In some places the articular cartilage has lost its regular structure with replacement by a considerable infiltration of fibrous tissue. The marrow of the epiphysis is rather scanty and throughout there are numerous fibrin deposits. The trabeculae of the epiphysis are generally normal. The epiphyseal cartilage line is almost entirely absent there remaining only a small amount of fibrocartilage. The articular cartilage on one side is penetrating in and along the articular line resembling somewhat the attachment of the articular cartilage to the physal articular line as is found in the very early developmental stages. The metaphysis is occupied by a considerable amount of fibrous tissue. The remainder of the bone of the diaphysis resembles that of the epiphysis.

Summary on Autotransplantation of the Epiphyseal Cartilage Line

This series of aut transplantations of the epiphyseal cartilage line is not sufficiently complete to definitely determine each step of the degenerative and regenerative processes. However there are enough sections to allow for the following deductions:

An early restoration of the marrow takes place in the transplant as is shown in the section at the twenty third day.

The trabeculae of the transplant at first degenerate and then regenerate by the formation of osseous tissue beginning at the periphery.

The epiphyseal cartilage line shows an early degeneration and at 3 day there is a definite line of cleavage separating it into a distal one third and a proximal two-thirds. The degeneration progressively increases with the length of the experiment and at 135 days only a slight remnant of the line is found.

Changes take place in the marrow of the host similar to those at the line of union in the transplant.

COMPARISON OF REIMPLANTATION AND AUTO-
TRANSPLANTATION OF THE EPIPHYSEAL
CAPITULUM LINE

In both autotransplantation and reimplantation changes in the transplants take place immediately after excision. The marrow becomes necrotic as seen in the section 4 days, then there is a further change and finally a regeneration of the marrow. The process is about the same in both the autotransplantation and reimplantation. The trabeculae likewise show early degeneration and later regeneration. The process of regeneration of the trabeculae seems to bear a relation to the relative amount of connective tissue present and perhaps slightly more rapid in the case of reimplantation.

The change in the epiphyseal cartilage line are variable unless the experiments are performed in exactly the same way. More or less injury at the time of operation or the size of the transplanted segment seems to influence the result. Thus in a reimplantation experiment at 1 day there is a more active degeneration than at 3 day but it is found that the articular cartilage is displaced in the 1 day experiment thereby affecting the result. The processes of degeneration are very similar in the reimplantation and autotransplantation but are perhaps a little more rapid in the latter.

REIMPLANTATION OF VARYING LENGTHS OF
THE LIPOTYSEAL END OF THE META-
CARPAL AND THE METATARSAL BONES

Method After exposing the metacarpal or metatarsal the bone is sectioned at the desired place. The capsule of the joint is opened and the entire transplant including the articular surface is removed care being exercised not to injure the epiphyseal cartilage line. The bone is immediately reimplanted. It is held in place by a suture passed through the cortex of the host and transplant and by sutures passing from the surrounding tissues over the articular end of the bone. Different lengths of bone are used

in the various experiments in order to determine if the size of the transplant exerts any influence on the results.

Experiment 1 Duration 1 days. Two-thirds length. Dog 30-38 growing animal.

Macroscopical description. Good healing is present but union is not firm. There is no increase in length of either operated or normal bone. The articular cartilage appears normal. The marrow of the transplant is paler than normal. The epiphyseal cartilage line is broadened and there is a pale white line extending through distal one-third.

Microscopical description. The articular cartilage appears normal. In this section the normal relation of the articular cartilage to the epiphyseal cartilage line, as is forced in the early developmental stages, is easily made out. It is continuous with the epiphyseal ossifying cartilaginous layer of the epiphyseal line (Fig. 7). The marrow of the epiphysis is almost entirely necrotic (Fig. 8). The nuclei of the trabeculae appear pale and are evidently degenerating. The epiphyseal cartilage line is swollen (Fig. 7). In the distal one-third the cartilage columns are distorted and there is more intercellular hyaline tissue than usual. The remainder of the epiphyseal line appears normal. In the metaphysis the provisional ossification zone is of normal arrangement but the nuclei of the cells are indistinct. The marrow of the diaphyseal part of the transplant is necrotic. The nuclei of the trabeculae take a pale stain and show evidence of early degeneration. The cortical bone is made up of pale staining nuclei except beneath the periosteum where there is some new osseous tissue. The bone of the host appears normal.

Experiment 2 Duration 3 days. On third length. Dog 30-38 young animal.

Macroscopical description. The appearance is similar to that described in the previous experiment.

Microscopical description. The articular cartilage appears normal. The marrow of the epiphysis is necrotic. The nuclei of the trabeculae of the epiphysis are pale but do not appear to be so extensively degenerated as in the previous experiment. The epiphyseal cartilage line is broader than normal but its cellular elements appear almost normal. In the metaphyseal part the columns of ossifying cartilage are in part degenerated those near the periphery show evidence of proliferation. The bone of the host appears normal.

In comparing the last two experiments it is evident that the degenerative processes are more rapid and extensive in the transplanted segment which is the longest.

Experiment 3 Duration 1 days. On half length. Dog 33 36L ge. months.

Macroscopical description. Good healing is present but owing to the displacement of the transplant it is ununited (Fig. 9). There is pro-

gressively a growth of the operated and the non-operated bone.

Microscopical description. The articular cartilage appears normal except for a fibrous thickening on the outer surface and small areas in which the nuclei stain poorly. The marrow of the epiphysis is substituted by asclous fibrous, and fatty tissue with here and there some necrotic marrow. The trabeculae of the epiphysis stain rather homogeneously the nuclei appearing as shadows. There is evidence of early regeneration of the periphery of the trabeculae. These cells look like young osteoblasts and appear to be closely related to the surrounding fibrous tissue. The epiphyseal cartilage line is degenerating as is shown by the fragmentation of the cartilage cells and distortion in the regular columnar arrangement. There is definite line of cleavage in the proximal one-third of the epiphyseal cartilage line (Fig. 10). In the metaphysis there is very little evidence of ossification of the cartilage, except at one border where there is a rich network of osteoid tissue. The intervening marrow is fibrous as is the marrow

of the diaphysis. The trabeculae of the diaphysis are scanty showing homogeneous central part about which there are osteoblasts forming new bone. The cortex of the transplant is made up of two parts, an inner homogeneous degenerated part and an outer cellular part composed of young woven osteoid tissue. In this experiment the cortex of the host and the transplant are in poor contact and it is interesting to note that the greatest amount of new osseous tissue is produced from the periosteum and endosteum on the side most distant from the host (Fig. 11 and 12). It is evident that this regenerated tissue is formed by the periosteum and endosteum of the transplant independently of the host. The cortex of the host is normal (Fig. 13).

Experiment 4 Duration 3 days. Two-thirds length. Dog 35-40 L age. months.

Macroscopical description. There is good healing and union of the transplant and the host. There has been no growth of operated bone while the normal has increased 5 mm. The articular cartilage appears to be in good condition but there is a thickening of the synovial membrane. On the glenoid surface of the transplant the marrow appears pale and yellow in contrast to the normal red color of the host. The epiphyseal cartilage line is broader than normal but has no definite defects.

Microscopical description. The articular cartilage appears normal except for a slight fragmentation of some of the cells of the middle layer and the pale staining of the inner layer. The marrow spaces of the epiphysis are occupied by a loose meshwork of connective tissue in which are numerous cellular elements suggesting the beginning formation of the marrow. The bone trabeculae appear degenerated but some at beginning to show regeneration as is evidenced by a proliferation of osteoblasts on the periphery to form young bone.

There is also a considerable formation of subperiosteal bone on the lateral border of the epiphysis. The epiphyseal cartilage line is wider than normal. At one border there is a large defect in the cartilage but aside from some fragmentation and irregularity in the distal one third of the cartilage columns the epiphyseal cartilage line is of normal appearance. On the epiphyseal side near the epiphyseal ossifying cartilage layer which stains poorly there is considerable amount of newly formed osteoid tissue. In the metaphysis there is a lack of the active ossification of the cartilage columns which appear elongated and are separated by fibrous tissue instead of marrow. The marrow spaces of the diaphysis are filled with loose fibrous tissue in which there are a considerable number of marrow cells. The trabeculae of the diaphysis are very numerous and the older ones show definite evidence of regeneration about their borders. The cortex of the diaphysis of the transplant is made up of old degenerated bone about which there is newly formed osseous tissue which seems to arise from the periosteum, endosteum and in the Haversian canals. The most marked regeneration is on the plantar side which is in part due to the ingrowth from the host. There is definite evidence that the bone of the transplant has some property of forming new bone independent of ingrowth from adjoining bone of the host. The elements of the host appear normal.

Experiment 1. Duration 35 days. Three fourth length. Holes bored in the transplant. Dog 3-406, age 2 months.

Macroscopical description. There is good healing and union is firm. There is no growth of the operated bone while the normal bone has increased 0.3 cm. The roentgenogram shows the shortening and absorption of the transplant (Fig. 14). The articular cartilage appears normal although it is much thinner than normal. The epiphyseal end of the transplant is darker than the diaphyseal part the latter being quite pale when compared with the normal. The epiphyseal cartilage line is quite distinct but is thinner and more irregular than normal. Proximal to the epiphyseal cartilage line in the metaphyseal region is a white band extending across the bone.

Microscopical description. The articular cartilage is much wider than normal and there is a tendency for the cells to form in groups. There is an occasional cell shadow but little evidence of degeneration except as is shown by the poor staining of some of the cells of the inner layer. The marrow of the epiphysis is practically all fibrous with a few scattered marrow elements in some parts. The trabeculae of the epiphysis are almost entirely regenerated some however still show the dead centers with new osseous tissue about the periphery (Fig. 5). In the epiphyseal artilage line there are numerous large holes both in the columns and at the junction with the metaphysis. The epiphyseal ossifying cartilage layer is well main-

tained. The metaphysis is replaced by fibrous tissue and osseous trabeculae. The marrow of the diaphysis is fibrous but becomes quite cellular at the end near the host although the latter was playing a considerable role in its replacement. Numerous osteoblasts are present. The trabeculae show advanced regeneration those farthest away from the host are in the most advanced stage again indicating the independence of the regeneration of the different elements of the transplant. The cortex of the transplant is thin and in places it is separated by bands of fibrous tissue. This appearance is due to the ingrowth of fibrous tissue into the holes that are bored into the transplant. The degenerated parts are being substituted by new periosteal and endosteal bone which does not appear to be definitely related to the host. At the line of union there is still considerable fibrous tissue and very little tendency of the cortical bone of the host to invade the transplant. The host is of normal appearance except at the line of union where there is some fibrous tissue invasion of its marrow cavity.

Experiment 16. Duration 44 days. One half length. Dog 33-44R, age 1 month.

Macroscopical description. There is good healing and firm union. There is no growth of the operated bone while the normal bone is only 0.3 cm. longer than it was at time of operation (Fig. 15). The articular cartilage appears white in comparison to the pink color of the other bones. The capsule of the joint appears normal. On longitudinal section the transplanted piece is pale the articular cartilage is broader than usual the epiphyseal line is indistinct and there is a white band across the metaphysis.

Microscopical description. The articular cartilage is broad and is divided into two different regions an outer in which the nuclei are stained deep and an inner in which they are stained light. The cells themselves do not appear to be degenerated. The marrow spaces of the epiphysis are occupied by loose fibrous tissue in which are scattered numerous new formed marrow elements especially on the dorsal surface. The trabeculae of the epiphysis are partially regenerated. There are also some new formed trabeculae. The epiphyseal cartilage line is in an advanced stage of degeneration (Fig. 16). The epiphyseal ossifying cartilage layer is best maintained but even that is being invaded by osseous and fibrous tissue. The columns of cartilage of the epiphyseal line have been entirely replaced by fibrous and osseous tissue. At the periphery of the epiphyseal cartilage line there is a considerable proliferation of cartilage beneath the perichondrium both in the region of the columns and in the ossifying cartilage of the epiphysis (Fig. 16). The ossifying cartilage columns of the metaphysis are entirely osseous and between them is fibrous tissue. The marrow of the diaphysis is partly regenerated being intermingled with vascular connective tissue. The trabeculae of the diaphysis are fully restored in fact there is a marked increase of osseous tissue

throughout this part of the transplant. The cortical bone is quite irregular and appears to be undergoing absorption about its borders. The line of union is bony and it is possible that the transplant is being regenerated by the host. The host appears normal.

Experiment Duration 5 days One-third length Dog 34-43L, age 34 months

Macroscopical description. There is good healing and firm union. The growth of the operated bone is 0.45 cm. while that of the non-operated bone is 1 cm. (Fig. 7). The joint capsule is thickened. The articular cartilage is blue and has lost its normal form. On the longitudinal section the marrow appears yellowish the epiphyseal cartilage line is absent and the cortex is thinner than normal.

Microscopical description. The articular cartilage is of normal arrangement and the cells appear quite intact. The marrow of the epiphysis is normal being composed of marrow-elements and fat. Some of the trabeculae are normal while others are made up of a cartilaginous center surrounded by normal bone. In some of the earlier stages the trabeculae are practically all osseous and it is rather difficult to explain the persistence of the cartilage at this time. The epiphyseal cartilage line is represented by a thin osseous cartilaginous band extending across the bone (Fig. 8). The metaphyseal region is occupied by fatty marrow. The marrow cavity of the diaphysis is filled with normal fatty marrow in which are few scattered trabeculae. The cortical bone of the transplant is of normal appearance except that it is not arranged in the normal, even and regular manner. There is a considerable amount of erosion on the outer surface and osteoclasts are quite numerous. The line of union persists as a thin band of bone. The bone of the host appears normal.

The operated bone shows 0.45 cm. increase in length since the time of operation. This is the only instance in the series in which there is any appreciable growth. It is possible that under some special favoring circumstance the epiphyseal cartilage line retains the property of increasing the length of the bone. In spite of this fact, the normal bone has increased three times as much as the operated bone and its epiphyseal line persists, while the epiphyseal line of the transplanted bone has disappeared (Fig. 7). Therefore, even if the transplanted epiphyseal cartilage line in this instance retains its power to proliferate, it does so only temporarily and to a very limited degree.

Experiment 18. Duration 5 days One-third length Dog 34-43R, age 3 months.

Macroscopical description. There is good healing and firm union. The growth of the operated bone is 0.15 cm. while that of the normal bone is .45 cm. (Fig. 19). The entire specimen was preserved in Kaberling.

Summary on Reimplantation of Varying Lengths of the Epiphyseal End of the Metacarpal and Metatarsal Bones

The articular cartilage shows only slight changes in the inner layers which is indicated by an irregularity in the arrangement of the cells and the loss of some of the nuclear stain.

The marrow undergoes an early necrosis. It is possible that some of the cells may persist and later share in the regeneration but this point cannot be definitely determined. The later stages show the marrow spaces filled with fibrous connective tissue after which there is a gradual restoration of the marrow.

The trabeculae even at 12 days show disappearance of their nuclei, and in the later stages there is a gradual regeneration which takes place through a peripheral substitution of the old bone. This regeneration occurs independently of the host and seems to bear some relation to the surrounding fibrous tissue.

The epiphyseal cartilage line at first shows a crumbling of the cells at the junction of the proximal two-thirds and distal one third. Then a fissure appears in this region following which there is a continuous and progressive degeneration of the entire cartilage. The more persistent part is the epiphyseal ossifying cartilage band. There is only a very limited attempt at regeneration in the parts just beneath the perichondrium.

The marrow of the diaphysis undergoes the same changes as it does in the epiphysis and there is no earlier regeneration in spite of its close proximity to the host, although it might receive additional elements from the host.

The changes in the trabeculae of the diaphysis do not differ from those in the epiphysis.

The cortical bone at first degenerates and is then regenerated by new bone which is formed from the endosteum and periosteum. In some of the sections there is a considerable amount of erosion beneath the periosteum. It is difficult to determine whether the bone is later substituted from the host, but at first it is definitely formed from the original periosteum and endosteum of the transplant.



Fig. 1. Normal epiphysis and metaphysis of a dog at 1 month. *F* Epiphyseal articular line. *B* Epiphyseal ossifying cartilaginous layer. *C* Columns of cartilage with fat and blood stained nuclei. *D* Columns of cartilage with osseous nuclei forming the boundary between the epiphysis and the metaphysis. *E* Metaphyseal ossifying cartilage. *G* Interosseous ossifying cartilage columns between which are marrow elements. *F* Trabeculae and marrow of the epiphysis. Microphotograph by \times inches B & L.

AUTOTRANSPLANTATION OF VARYING LENGTHS OF THE EPIPHYSEAL END OF THE METACARPAL AND METATARSAL BONES

Method. These experiments consisted of removing different lengths of the distal end of the metacarpal or metatarsal bones including the epiphyseal cartilage line and exchanging it with a similar piece from one of the bones of the opposite foot. The technique is the same as that employed in the reimplantation.

Experiment 10. Duration 34 days. One half length in union. Dog 10—R age 5 months.

Macroscopical description. The healing is good and firm union exists between the transplant and the host. There is no growth of the transplanted bone but the normal growth is 0.6 cm. The

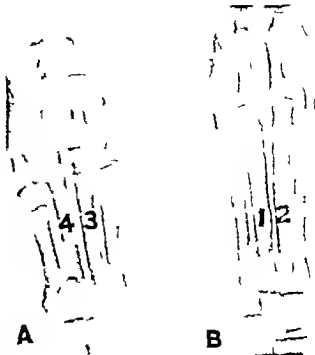


Fig. 2. Roentgenogram of the front and hind feet of a dog showing the relative length of the metacarpal and metatarsal bones. *A* Front feet. Notice that the metacarpal bones 3 and 4 are of equal length. This is a standard for comparison and method whereby the amount of growth can be estimated. *B* Hind feet. Notice that the metatarsal bones 1 and 2 are practically of equal length.

joint is in good condition although there is a thickening of the capsule. The marrow of the transplant is scanty. The epiphyseal cartilage line can still be made out as a thin line on longitudinal section.

Microscopical description. The articular cartilage is quite irregular. The persisting cartilage is of normal arrangement but the nuclei are shrunken. The marrow near the articular cartilage is quite normal while the remainder is fibrous. The trabeculae of the epiphysis are more numerous than usual but they stain poorly with the exception of the part near the periphery of some where there is newly formed bone. The epiphyseal cartilage line is in part entirely replaced by fibrous tissue while the remainder is undergoing rapid degeneration. The epiphyseal ossifying cartilaginous layer is the best maintained. The metaphysis is entirely replaced by fibrous and new osseous tissue. The marrow of the diaphysis is entirely fibrous. The trabeculae of the diaphysis are composed of new bone although in the center of some are old nuclear free remnants of bone. The original cortex is homogeneous and the nuclei appear as shadows. There is a new formed endosteal and periosteal bone about the old cortex. At the line of union there is a large amount of callus of both endosteal and periosteal type which comes from both the transplant and the host. The end of the articular



Fig. 3. Experiment 3, 33 days, Dog 333. Regeneration of the trabeculae after transplantation takes place by the formation of new osseous tissue about the periphery of the dead bone which is gradually substituted. It occurs independently of the host and is the same in autotransplantation and in retransplantation. 4 Dead bone. B New osseous tissue on the periphery. C Organization of the marrow. Microphotograph obj 14 oc 10 inches, B & L.

fragments take a very minor part in the formation of this callus. The elements of the host appear normal.

Experiment 30. Duration 34 days. Split on half length. Dog 9-5L, age 5 months.

Macroscopical description. The healing is good but the union is not firm. There is no growth in the operated bone while the normal is increased about 6 cm. The articular cartilage is rough and irregular. The epiphyseal cartilage line is markedly changed. In this experiment the transplant has been split longitudinally before insertion.

Microscopical description. The articular cartilage is rough and irregular and in places is entirely absent. The splitting of the bone is responsible for some of these changes. The marrow is replaced by fibrous tissue although on one side there are some marrow-cells which are possibly regenerated cells. The trabeculae are made up of an outer new osseous layer within which is old dead bone. The epiphyseal cartilage line is fissured at the junction of proximal two-thirds with the distal one-third but is not so extensively altered as it is in the previous experiment. The metaphysis is of fairly normal appearance although there is not the active proliferation as under normal conditions. The marrow-cavity of the diaphysis is for the greater part fibrous with some scattered areas containing few marrow elements. There are some newly formed trabeculae in the diaphysis the older ones are necrotic or are surrounded by newly formed bone. The cortex of the diaphysis is homogeneous and without vascular staining. There is a small amount of regenerated bone from endosteum, periosteum and Haversian canals. There is more evidence of regeneration at distance from the host than in the immediate vicinity. There is considerable amount of callus from the host which is mostly

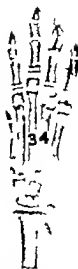


Fig. 4. Experiment 4, 43 days, Dog 334L. Replantation of the epiphyseal cartilage line. Second bone from the right, 4 shows reimplanted epiphyseal line 6 cm. shortening. The metacarpals, 3 and 4 are normal of equal length.

derived from the periosteum and penetrating into the marrow-space between the host and the replant.

After splitting the bone some of the elements seem to retain their vitality longer.

Experiment 1. Duration 44 days. (One-half length) Dog 1L, age 5 months.

Macroscopical description. There is good healing and firm union of transplant and host. The transplanted bone shows no increase in length, while the normal bone is 6 cm. longer. The transplant is broader than normal. The articular cartilage appears thickened as is the capsule of the joint. The transplant is yellow instead of the normal red color. The epiphysis is wider than normal and has lost its gelatinous appearance. The metaphysis there is a white band of new tissue.

Microscopical description. There is marked fibrous thickening of the articular surface. The cartilage is rather irregular being thicker on one side than on the other. The cells, however, appear to be normal except in one area, where there is some degeneration. On the plantar and the marrow of the epiphysis is almost of normal appearance while on the dorsal surface it is fibrous. The trabeculae of the epiphysis are almost entirely regenerated. The epiphyseal cartilage line shows extensive degeneration changes throughout there being large holes crumbling of the columns, and some invasion of fibrous tissue. There is slight regeneration near the perichondrium on one side. The metaphysis is undergoing degeneration which accounts for the white band seen in the gross specimen. The marrow of the diaphysis is partly



Fig. 1. Experiment 12. Dog 33. In the degeneration in the epiphyseal cartilage line (A) it is transplanted (B) the epiphyseal cartilage line (C). Degeneration in the epiphyseal cartilage line (A) and necrosis (B) in the junction of the epiphyseal cartilage and the columnar cartilage. Microphotograph (A) in hem. B & L.

imposed of normal element and a part is substituted by fibrous tissue. The trabeculae are entirely regenerated. The outer surface of the cortex is irregular and there is some evidence of periosteal new bone. The line of union is articular with a considerable increase of osseous trabeculae on either side.

Experiment 12. Duration 43 days. Two third length. Dog 30. 4 R. Age 3 months.

Macroscopical description. The healing is good and the union is firm. The increase in length of the operated bone is 0.1 cm while the normal is 0.3 cm (Fig. 2). The joint is well formed and contains small amount of synovial fluid. The artilage appears more white than normal. The epiphysis is of normal size. The epiphyseal cartilage line is hardly distinguishable while in the metaphysis there is whitening of the tissue that appears like a line. The layer of marrow is very pale and thick although there is a marked increase of the trabeculae.

Microscopical description. The articular surface is all normal in appearance. The marrow with the trabeculae contains large number of

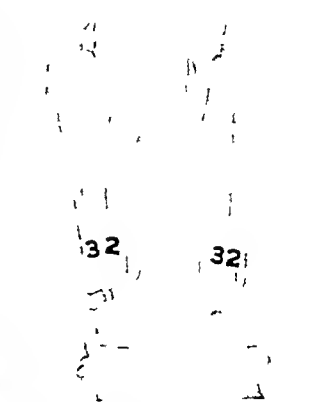


Fig. 2. Experiment 12. Dog 30. In the transplanted (B) the epiphyseal cartilage line (A) and bone from the right (C) in each (A) and (B) the transplanted (B) line (A) evidence of epiphyseal line increase in length of 0.1 cm normal increase in B & L is 0.3 cm normal (equal length).

normal cellular element but there is considerable increase in osseous trabeculae and the trabeculae of the epiphysis are practically entirely regenerated (Fig. 3). The epiphyseal cartilage line is distorted and degenerated (Fig. 4).

Toward the periphery there is some regeneration of artilage which appears to arise from the periosteum and the outer artilage layers especially on the plantar side. The epiphyseal cartilage layer is osseous while the remaining part of the epiphysis is substituted by fibrous tissue.

Fig. 3. The artilage cells at the junction of the metaphysis are fairly well preserved while the osseous trabeculae columns are entirely changed into osseous tissue. The marrow of the metaphysis is made up of loose fibrous tissue in which are scattered many marrow cells. There are considerable number of new trabeculae in the metaphysis and the old ones have been nearly regenerated for an occasional small piece. The marrow evidence of osteonaplasia with a new periosteal and endosteal layer and a new dead bone area appearing in the metaphysis with the new trabeculae in the metaphysis and the new trabeculae in the metaphysis.

The evidence of osteonaplasia with a new periosteal and endosteal layer and a new dead bone area appearing in the metaphysis with the new trabeculae in the metaphysis and the new trabeculae in the metaphysis.

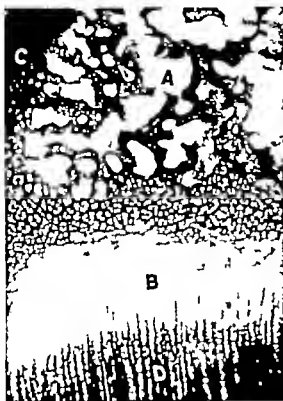


Fig. 7. Experiment 34. Duration 30-35 days. Dog 30-35. Reimplantation of two-thirds of the epiphyseal end of the metatarsal bone. A Epiphyseal end containing necrotic marrow. B epiphyseal cartilage line wider and more irregular than normal. C articular cartilage inserted into the epiphyseal cartilage line as specimen is from a very young animal. D metaphysis. Microphotograph obj. 5 oc. inches B & L.

Experiment 33. Duration 43 days, two-thirds length. Dog 36-4 L, age 1.5 months.

Macroscopical description. The appearance corresponds to that of the previous experiment except that the epiphyseal cartilage in this case is more intact than on the opposite side and the epiphysis is of a darker red color.

Microscopical description. The findings in general are similar to those of the previous experiment except that the marrow cells are more abundant and the epiphyseal cartilage line is a better site of preservation. There is also a line of columnar cartilage cells in the diaphysis which are possibly cartilage cells remaining behind during the normal growth of the bone.

Experiment 34. Duration 43 days. One-third length. Holes bored into the transplant. Dog 40-37 L, age 3.5 months.

Macroscopical description. There is good healing. Neither the operated nor the normal bones show any evidence of growth in length since the operation. The joint-capsule is thickened and the



Fig. 8. Experiment 34. Dog 40-37. Showing the early resorption of the marrow (A) after reimplantation of segment of bone. B Normal marrow (this higher magnification of the marrow shown in Fig. 7). A normal marrow of the bone in the same experiment (transverse transplant on right, labeled in order to bring out the marrow). B normal trabeculae. Microphotograph obj. 5 oc. inches B & L.

joint cavity is filled with fibrous tissue. The surface of the transplant is covered with a whitish, cartilaginous appearance. The roentgenogram shows the condition of the transplant (Fig. 3).

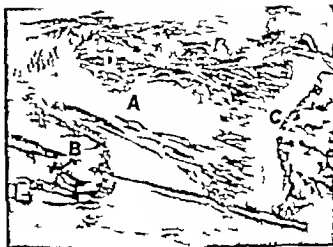
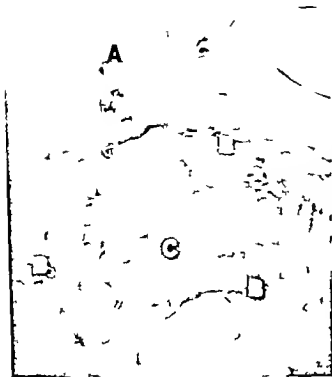
The entire specimen was preserved in Haversling solution.

Experiment 35. Duration 43 days. One-third length. Dog 40-38 R, age 3 months. Homotransplantation. Holes bored into the transplant.

Macroscopical description. Good healing is present. This is the only sample of homotransplantation in the series, the inverted transplant being taken from the animal. It is described at this time in order to allow for comparison with the previous experiment. The operated bone measures 0.5 cm. in length. It did not take the time of operation while the normal bone measures 5 cm. more. There is some roughening of the articular cartilage and thickening of the capsule. A longitudinal section of the transplanted segment is of a yellow color and shows more evidence of degeneration than the transplant of the same animal. This is clearly shown in the roentgenogram (Fig. 3). The entire specimen was preserved in Haversling solution.

Experiment 36. Duration 43 days. One-half length. Dog 39-4 L, age 3 months.

Macroscopical description. There is good healing and firm union. The growth of the operated bone is 5 cm. while that of the non-operated bone is 4 cm. The joint-capsule is thickened and there is some roughening of the articular cartilage. On longitudinal section the bone is of normal color. The epiphyseal cartilage line is bent and in its place there is a small amount of soft tissue.



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Microscopical description: On the outer surface of the articular surface there is a thin layer of homogeneous stained tissue. Within this layer the cells appear normal in arrangement and structure. The marrow of the dorsal half of the epiphysis is normal while that of the plantar side is largely replaced by fat. In the tibia the trabeculae of the epiphysis appear normal. The physalarticular ligament is represented by a small amount of cartilage the greater part of which is absent thereby allowing a communication between the marrow spaces of the diaphysis and epiphysis. The metaphysis is entirely replaced by marrow and osseous tissue. The marrow and trabeculae of the diaphysis appear normal. The cortex is composed of normal bone but there is a considerable amount of osseous union of the tibia and proximal end of the humerus indicating union of the two elements of the humerus normal.

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Macroscopic description: There is good healing in the union. The growth of the transplanted bone is minimal while the normal growth is 1 cm (Fig. 4). The joint capsule is thickened but the articular surface appears normal. (On section the epiphyseal plate and the epiphyseal plate line is absent. The epiphyseal articular line is the normal line in the joint.)

Microscopical description. The articular cartilage is of normal structure although the nuclei take a pale stain. The epiphyseal marrow is of the normal fatty type. The trabeculae of the epiphysis for the most part have a normal structure although the nuclei of some take a light stain. The epiphyseal cartilage line is absent. The marrow of the diaphysis is normal and is confluent with that of the epiphysis. The trabeculae of the diaphysis appear normal. The cortex is irregular in the region of the epiphysis where there is considerable erosion of it, while elsewhere it is normal.

E. perimutata Duration 143 lay (On fourth
length Dog 5-3 L age 2 months

Macroscopic Description There is good healing. The operated bone has increased 0.1 cm in length while the normal bone has increased 1.3 m. The epiphysis of the normal bones are fully ossified (Fig. 24). The specimen was preserved intact.

Summary on Autotransplantation of Larving Lengths of the Epiphysis

In the autotran plantation there are more evidences of destruction of the articular cartilage than in any of the other experiment. In some section there is considerable erosion and substitution with fibrous tissue. In others partial regeneration of cartilage

The marrow of the epiphysis at first becomes necrotic. At a later period the marrow spaces are occupied by fibrous tissue.

At a still later period the marriage resumes



Fig. 4. Experiment 1. Dog 331. This is higher magnification of the epiphyseal cartilage line shown in Fig. 4. Epiphyseal cartilage line 7 day after transplantation. B normal epiphyseal cartilage line for comparison. Notice the irregular rumbling and flowering of the transplanted epiphyseal cartilage line. Microphotograph obj oc. Joches, B & L.

almost a normal structure. The regeneration seems to take place independently of the host. The exact method and source of the regenerated marrow could not be determined.

The trabeculae of the epiphysis at first undergo degeneration, and then by a process of new formation beginning at the periphery are completely regenerated.

The epiphyseal cartilage line undergoes a progressive and complete degeneration. There is some regeneration beneath the perichondrium in the early stages. This new cartilage does not possess the normal property of increasing the length of the bone.

The marrow and trabeculae of the diaphysis are subjected to the same changes as are the marrow and trabeculae of the epiphysis.

The cortex at first shows extensive degeneration but later there is regeneration from the periosteum and endosteum independently of the host. However in the later stages there is considerable bone erosion on the surface and fibrous tissue penetration.

COMPARISON OF REIMPLANTATION AND AUTOTRANSPLANTATION OF VARYING LENGTHS OF THE EPIPHYSEAL END OF THE METACARPAL AND THE METATARSAL BONES

The changes in the articular cartilage are more marked in autotransplantation than

in reimplantation although even in autotransplantation they are not very extensive.

In both autotransplantation and reimplantation the marrow of the epiphysis very early becomes necrotic. The necrotic marrow is replaced by fibrous tissue which in turn is substituted by new marrow-elements. The regeneration appears to take place more rapidly in autotransplantation.

The trabeculae of the epiphysis undergo practically the same changes in both autotransplantation and reimplantation there being at first degeneration and later gradual new formation which begins on the periphery of the trabeculae. The rate and degree of degeneration and regeneration are relatively the same in each case.

The epiphyseal cartilage line undergoes a gradual and persistent degeneration in both autotransplantation and reimplantation. In some cases the regeneration seems to be more rapid in the reimplantation than in autotransplantation while in others the opposite seems to occur. In general the processes are similar in both instances.

The marrow of the diaphysis undergoes the same changes as in the epiphysis in both autotransplantation and reimplantation. The changes take place in about the same order and degree in both cases although there is perhaps an earlier regeneration in autotransplantation.

The changes in the trabeculae of the diaphysis are similar to those which take place in the epiphysis.

The cortical bone in both autotransplantation and reimplantation at first degenerates and is then restored by means of proliferation from the periosteum, endosteum and about the Haversian canals of the transplant. There is erosion about the surface of the cortex in both groups but it is more intense in the autotransplantation. Although there is independent regeneration of the cortex from the periosteum and endosteum of the transplant, it can not be denied that the host plays a part in the new formation especially as concerns the permanent bone.

Firm union of the transplant and host occurred in both types of experiment.

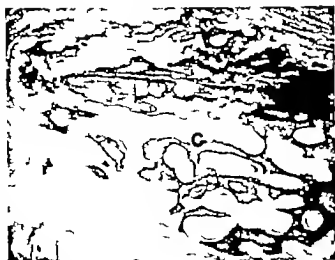


Fig. 1. Experiment 1. Dog 331. High magnification of the host bone. The transplant is placed in the prepared groove. The host bone is the articular end of the metacarpal. The transplant is the articular end of the metatarsal. The host bone is the articular end of the metacarpal. The transplant is the articular end of the metatarsal. Compare the normal articular end of the metacarpal with the transplant.



Fig. 2. Experiment 2. Dog 331. High magnification of the host bone. The transplant is placed in the prepared groove. The host bone is the articular end of the metacarpal. The transplant is the articular end of the metatarsal. Compare the normal articular end of the metacarpal with the transplant.

EXPERIMENTAL TRANSPLANTATION OF DIFFERENT LENGTHS OF THE EPIPHYSEAL END OF THE METACARPAL AND THE METATARSAL BONES

Method. The two central metacarpal or metatarsal bones are exposed. By means of a sharp knife the two bones are transected at the same level. The proximal part of one bone and the distal part of the other are removed. The two remaining segments are united together by means of a suture passed through the cortex of each bone (Fig. 1). The wound is then closed. After sufficient time has elapsed the clips are removed and the animal is placed in a cast in which the distal segment containing the epiphyseal articular surface is separated from the articular surface up to the line of union. Care is taken not to disturb the union or injure the epiphyseal articular surface. The wound is closed and the articular end is held in a light plaster cast for healing. In some of the experiments only the first stage of the procedure is completed.

Experiment	Duration	First stage
1	10 days	10 days
2	10 days	10 days
3	10 days	10 days
4	10 days	10 days
5	10 days	10 days
6	10 days	10 days
7	10 days	10 days
8	10 days	10 days
9	10 days	10 days
10	10 days	10 days

1.04 m long rather than normal. The articular articular end appears normal. The transplant is of fairly normal appearance through out.

Microscopic description. Only the proximal part of the bone including the line of union is present in the section. There is a large amount of cortical allumina in the plantar side arising from both host and transplant with a layer of fibrous tissue between the two ends. Numerous polymorphonuclear cells are to be seen at the junction. On the dorsal surface allumina is present only on the side of the host. The marrow of the transplant appears normal except at the line of union where there is an increase of polymorphonuclears. The trabeculae appear normal. The cortex of the transplant has lost its normal staining and appears dead at the line of union. In and around the distal end of the transplant is new bone which arises from the periosteum, endosteum and about the haerian canal. The cortex of the transplant more distant from the line of union which is not separated from the normal bone appears alive and unchanged.

Experiment 10. Duration 4 days. First stage. On half length. Dog 111R. Age 1 month. Microscopic description. The half length of the bone is 0.3 m longer than the normal is 0.0 m longer than at the time of the operation. At the time of union the articular surface is normal. The articular articular end of the transplant is normal through out the entire length of the epiphyseal articular line. The articular articular end of the transplant is normal through out the entire length of the epiphyseal articular line.

Microscopic description. The articular articular end of the transplant is normal through out the entire length of the epiphyseal articular line. The articular articular end of the transplant is normal through out the entire length of the epiphyseal articular line.



Fig. 4 (left) Experiment 5 (54 days) Dog 3-41R. Reimplantation of the epiphyseal (two-thirds of the metacarpal bone after boring holes in the transplant. Second bone from the right. 4, shows the amputated segment under going absorption. N growths since operation. Normal bone grew 3 cm. Compare 3 and 4 which are normally equal.

Fig. 5 Experiment 6 (44 days) Dog 31-41R. Reimplantation of one-half of the epiphyseal end of the metacarpal bone. Second bone from the left. 4, shows reimplanted segment 7 mm shorter than. Compare 3 and 4 which normally are of equal length.

normal. The metaphysis is normal and there is an exceptionally good blood supply. The marrow of the diaphysis is normal except at the line of union where there are fibrotic and necrotic changes. The trabeculae of the diaphysis are normal. The cortex is surrounded by a large amount of periosteal and slight amount of endosteal new bone. At the line of union there is heavy cartilaginous callus chiefly of the periosteal type which appears to arise from both the host and the transplant. The various elements of the host are normal. It is interesting to note that the only changes are near the line of union, which one would expect to be the case as in the first stage of the experiment it is the only portion of the bone which is disturbed.

Experiment 3. Duration 89 days. First stage one-half length. Dog 6 goes on this. All microscopic description. There is growth of the normal the operated bone. The articular cartilage appears normal. There is slight amount of marrow in the epiphyseal end otherwise the marrow cavity is small and its elements are scanty. A pseudoarthrosis is present.

Microscopic description. The articular cartilage appears thin but the cells are normal. The marrow is fatty and the cellular elements are scanty. The trabeculae of the epiphysis are normal. The epiphyseal cartilage line is bent so that the diaphyseal and epiphyseal marrow spaces are

continuous (ditto animal). The trabeculae and the marrow of diaphysis resembles those of the epiphysis. The cortex is thin and shows some erosion on its surface. There is periosteal and endosteal callus on the surface of both the host and the transplant but on account of an intervening fibrous layer pseudoarthrosis results. The greatest amount of callus is the side of the host.

Experiment 13. Duration 25 days. First stage 3 days. Second stage 22 days. On half length. Dog 20 goes on this.

Macroscopic description. The wound is infected and the transplant which is devoid of periosteum lies loose in the wound. The growth of the operated bone is 5 cm while the growth of the normal is 0.5 cm.

Microscopic description. The articular cartilage is of normal appearance. The marrow of the epiphysis is almost entirely necrotic. The trabeculae show signs of degeneration. The epiphyseal cartilage line shows some shrinking of the nuclei and distortion of the cartilage columns. There is evidence of degeneration in the metaphysis and an invasion of polymorphous leucocytes between the ossifying cartilage columns. The marrow of the diaphysis is likewise necrotic and contains numerous collections of polymorphous leucocytes. The trabeculae are degenerated. The cortex is poorly and on its outer surface there is considerable amount of callus. These changes cannot be considered as being entirely due to the transplantation on account of the concurrent infection. The host appears normal although there is no increase of polymorphous leucocytes in places.



Fig. 5 Experiment 6 (44 days) Dog 31-41R. Showing new formed cartilage at the periphery of the epiphyseal cartilage line 44 days after reimplantation of one-half of the epiphyseal end of the bone. The epiphyseal cartilage line is degenerated and substituted by fibrous and osseous tissue. A New formed cartilage at the border from the perichondrium. B substitution of the epiphyseal cartilage line by fibrous and osseous tissue. C metaphysis. D epiphysis. Microphotograph of 15 oc. inches, B & D.



Fig. 19 Experiment 8 9 days, Dog 34 49R. Re-implantation of the epiphyseal two-thirds of the metacarpal bone. Second bone from the left A shows the implanted segment completely united (compare with normal 2) \ absence of epiphyseal line. Notice presence of epiphyseal line in normal bone. Growth of operated bone = 4 cm. growth of normal bone = 4.5 cm.

tissue in the joint and the cartilage appears whiter than normal. On longitudinal section the epiphyseal part of the transplant is paler than the diaphyseal part the latter being of normal color. The epiphyseal cartilage line is not so regular as normal and white band is seen in the metaphyseal region. The line of union is composed of osseous tissue.

Microscopical description. The articular cartilage is normal except on one end where there is fibrous tissue mass extending into the joint cavity. At this place there is a defect in the perichondrium and fibrocartilaginous proliferation. The marrow of the epiphysis is degenerated and in its place is fat and fibrous tissue with few cellular elements. The trabeculae of the epiphysis are homogeneous with cell shadow scattered throughout. The distal bone of the epiphysis stains poorly. In the epiphyseal ossifying cartilaginous band there is loss of nuclear staining of the osseous part. The epiphyseal cartilage layer is of about normal thickness but the cartilage of minor zigzagged and the cells are beginning to show degenerative changes. Beneath the perichondrium on either bond there is some perichondrial new formed cartilage. The metaphyseal ossifying cartilaginous layer is well maintained. The osseous cartilaginous columns of the metaphysis are practically intact. The marrow of the diaphysis shows extensive regeneration. The trabeculae of the diaphysis are normal except near



Fig. 20 Experiments 10 and 14 days, Dog 30-45 R and L. Autotransplantation of the epiphyseal two-thirds of the metacarpal bone. Second bone from the right 1 on each foot shows the operated metacarpal bones. Compare 1 and 2 both normally are of equal length \ growth since operation on 1. Normal growth = 5 cm.

the metaphysis where some contain poorly stained nuclei. The nuclei of the cartilage in the region of the metaphysis poorly stained but on approaching the line of union they take deeper and more form stain. There is periosteal and endosteal new bone on the right. The line of union is not well shown but there is considerable network of new periosteal and endosteal bone in that region. The elements of the host appear normal. The marrow is of the mature fatty type. The host undoubtedly exert marked influence on the transplant. This experiment as is shown by the more marked general changes in the part nearest to it.

Experiment 15 Duration 6 days. First time 45 days second time 5 days. Length two-thirds. Dog 8 20 age 6 months.

Microscopical description. There is good healing and firm union.

In this experiment the operated bone is found to be 7 cm longer than the first operation, while at the end of the experiment it is 9.9 cm longer. Thus, there is 2.9 cm. growth since the second operation. During the life time the growth of the normal bone is 6 cm. which is practically the

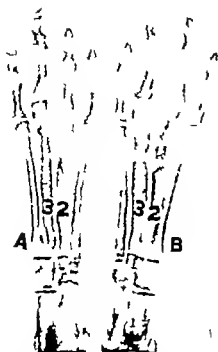


Fig. 23. Experiments 24 and 5, 45 days. Dog 40-17. Autotransplantation and homotransplantation of the epiphyseal one-third of the metatarsal bone (bored holes into triangle 1). Left foot, A, second bone from right, shows the marked absorption of the homotransplant. Right foot, B, second bone from right, shows low degree of absorption in the autotransplant. Bones 1 and 3 should be of equal length.

nuclei (Fig. 7). The greater part of the epiphysis is composed of fibrous tissue in which are some scattered cellular elements. The epiphyseal trabeculae appear normal. Of the epiphyseal cartilage line there remains only a small amount of cartilage beneath the perichondrium near the surface. The remainder is ossified and is continuous with the newly formed trabeculae of the diaphysis. The marrow of the diaphysis is scanty. The elements of the host appear normal.

Experiment 137. Duration, 55 days. First stage, 5 days; second stage, 4 days. Dog 5-26. Age about months.

Macroscopic description. There is good healing but non-union occurred after both operations (Fig. 5). The operated bone measures 0.4 mm. less than at the time of the operation, but the normal bone is 0.5 mm. longer.

Summary on the Two-Stage Autotransplantation of Varying Lengths of the Epiphyseal End of the Metacarpal and the Metatarsal Bones

The articular cartilage is well maintained in every case except in Experiment 36 where

there is some evidence of degeneration of the inner layer.

The marrow of the epiphysis does not undergo any change following the first operation but immediately after the second operation degeneration occurs. It at first becomes necrotic then fibrous, and finally is regenerated. The regeneration is similar to that which occurred in reimplantation and autotransplantation although it takes place more rapidly.

The trabeculae remain unchanged during the first stage but immediately following the second operation they undergo degeneration. Regeneration then takes place in the usual manner by peripheral formation and substitution with new osseous tissue.

The epiphyseal cartilage line is well maintained during the first stage and though it functions that property is restricted to a considerable degree. After the second op-

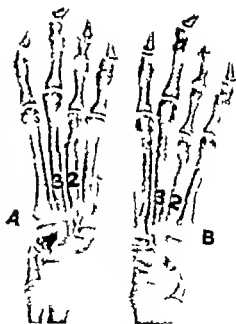


Fig. 24. Experiments 7 (A) and 38 (B), 45 days. Dog 20-37. Autotransplantation of the epiphyseal one-third of the metacarpal bone. Second bone from right in each foot shows the union of the transplanted segments. Growth of operated bones, 5 cm.; growth of normal bone, right, 4 cm., left, 6 cm. Bones 1 and 3 are normally of equal length.

cratic even if there is good union between the transplant and the host it functions almost entirely lost and it undergoes a slow degeneration. The most marked disturbance in growth occurred when there was no union at the second operation.

The marrow of the diaphysis is more rapidly and completely regenerated than that of the epiphysis. This is due to the additional marrow cell supplied by the host.

The trabeculae of the diaphysis degenerated after the second operation but finally regenerated by the formation of new secondary tissue beginning on their periphery. The regeneration occurs before it lies in the distal part which can possibly be explained by its closer proximity to the host.

The cortex is regenerated by means of periosteal endosteal and haversian new bone which is formed independently of the host. Undoubtedly the host supplies additional



Fig. 1. Epiphysis distal. Diagram A shows the results of autotransplantation of the epiphysis of the metacarpal bone. Diagram B shows the results of autotransplantation of the epiphysis of the third metacarpal bone. In both diagrams, the epiphysis is shown in the center, with the diaphysis on either side. The epiphysis is labeled 1 and the diaphysis is labeled 2. The results of autotransplantation are shown in the center, with the epiphysis in the center and the diaphysis on either side. The epiphysis is labeled 1 and the diaphysis is labeled 2. The results of autotransplantation are shown in the center, with the epiphysis in the center and the diaphysis on either side. The epiphysis is labeled 1 and the diaphysis is labeled 2.

new bone which is of a more permanent nature than that arising in the transplant itself.

COMPARISON OF THE TWO-TAGE AUTOTRANSPLANTATION WITH THE ONE-TAGE AUTOTRANSPLANTATION

The degenerative and regenerative processes in the articular cartilage, the marrow of the epiphysis and the trabeculae of the epiphysis are very similar in both the two-tage and the one-tage experiment.

The degenerative changes in the epiphyseal cartilage line take place lower in the two-tage operation but the final result is the same, namely, complete degeneration and loss of function.

The regenerative changes in the marrow and trabeculae of the diaphysis are more rapid in the two-tage experiment because of the greater influence of the host.

The cortex likewise is more rapidly regenerated in the two-tage than in the one-tage experiment.

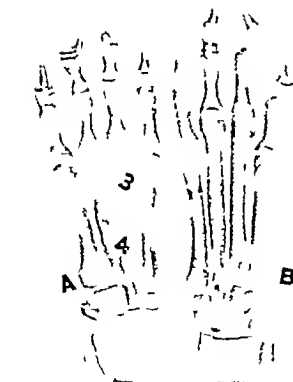


Fig. 2. Epiphysis distal. Diagram A shows the results of autotransplantation of the epiphysis of the metacarpal bone. Diagram B shows the results of autotransplantation of the epiphysis of the third metacarpal bone. In both diagrams, the epiphysis is shown in the center, with the diaphysis on either side. The epiphysis is labeled 1 and the diaphysis is labeled 2. The results of autotransplantation are shown in the center, with the epiphysis in the center and the diaphysis on either side. The epiphysis is labeled 1 and the diaphysis is labeled 2.



Fig. 7. Experiment 36. Post-operative. Dog 3. A shows the degeneration that takes place in the inner layer of the articular cartilage. B Outer proliferating zone. C Inner degenerating zone. Microphotograph of section B & C.

REIMPLANTATION OF AN ENTIRE METACARPAL OR METATARSAL BONE

Method. The entire metacarpal bone is raised from its normal bed and then immediately reinserted and anchored in place with suture extending from the neighboring tissues.

Experiment 38. Duration 5 days. Dog 3. Age 18 months. Metatarsal bone.

Macroscopical description. The wound is healed without infection. There is 0.2 cm. of growth of the operated bone while the normal bone is 0.7 cm. longer. The transplant is found in normal position. New joints have formed at the ends.

Microscopical description. There is considerable amount of fibrous tissue in the joint cavity and slight thickening of the outer layer of perichondrium. The articular cartilage appears normal. The marrow of the epiphysis is quite cellular and shows definite changes. The trabeculae of the epiphysis are normal although the nuclei are not so prominent as usual. The epiphyseal cartilage is entirely changed and only a thin end beneath the perichondrium is cartilaginous to be found. This cartilage appears to be an outgrowth of proliferation. The cartilage columns are lucent and in their place is

In the subsequent experiment one of the distal ends of the epiphysis of the metatarsal bone was removed and the epiphysis of the metatarsal bone was reinserted and anchored in place with suture extending from the neighboring tissues. The epiphysis was found to be described in the other experiments.

hyaline fibrous tissue which still preserves some of the parallel columnar arrangement. The metaphyseal region is occupied by a network of new bone. The marrow of the diaphysis is quite cellular. The trabeculae of the diaphysis are partly degenerated in the center. The osteons in places are poorly defined and in close contact with the surrounding fibrous tissue.

Experiment 39. Duration 4 days. Dog 3. Age 18 months. Lateral bone.

Macroscopical description. The condition is the same as in the previous experiment.

Microscopical description. The articular cartilage is partly degenerated in the inner layer. The marrow of the epiphysis appears fairly normal. The trabeculae of the epiphysis contain small shadows in their centers, surrounding which is normal bone. The epiphyseal cartilage line is represented by hyaline band in which there are shadows of fibrous tissue. At the periphery there is proliferation of cartilage which extends into the diaphysis. There is only a small amount of the diaphysis in the section. A marked periosteal and endosteal proliferation is seen on the side while on the other there is marked absorption of the osteon.

Experiment 40. Duration 4 days. Dog 3. Age 18 months.

Macroscopical description. There is good healing. No growth has occurred in the operated bone. The normal bone is 3 cm. longer (Fig. 8). The joint capsule is thickened. The bones appear slightly thicker than normal. The articular cartilage is not so thick as usual. The epiphyseal cartilage line is of pinkish color. There is evidence of degeneration as seen both in the gross specimen and in the roentgenogram. The specimen is preserved in Kammerling's solution.

Experiment 41. Duration 3 days. Dog 4. Age 18 months.

Macroscopical description. There is good healing. There is no growth of the operated bone while the non-operated bone is 3 cm. longer (Fig. 8). The joint cavity is in fairly good condition. On longitudinal section the epiphysis is of normal color. The epiphyseal cartilage line is absent but is present in the normal bones. The marrow of the diaphysis is scanty and the cavity is irregular in outline. The osteon is of varying thickness.

Macroscopical description. The articular cartilage is regular and places also defect. The synovial membrane is thickened and there is some fibrous tissue deposit on the cartilage. The articular cartilage is composed of poor quality cells in process of degeneration. There is a considerable amount of fibrous tissue penetrating the cartilage substance. The marrow of the epiphysis of the mature fatty type. The trabeculae of the epiphysis are poorly stained. The epiphyseal cartilage line is disapparing red, a few cartilage remnants being left. The marrow of the trabeculae of the diaphysis resemble those of the epiphysis. The osteon is very irregular. The osteon is

stains poorly although there is evidence of both endosteal and periosteal proliferation. The general appearance of the sections indicates that a uniform slow degeneration is occurring throughout the bone in which regenerative processes had previously occurred.

Experiment 42 Duration 113 days. Dog 3R age 3 1/2 months.

Macroscopical and microscopical descriptions. The changes are similar to those described in the previous experiment.

Experiment 43 Duration 115 days. Dog 3R age — old dog.

Macroscopical description. There is good healing. There is no increase in length of the operated nor the normal bones. The joint is re-formed; the capsule is thickened and the articular surface is rough. On longitudinal section it is noted that the marrow is very scanty having been replaced by fibrous tissue. The cortex is quite irregular and appears to be eroded on its surface.

Microscopical description. The section takes a very poor stain so that it is difficult to determine the various changes. The articular cartilage appears fairly normal. The trabeculae show little change. The marrow is fibrous and fatty. The cortex is quite irregular and there is extensive erosion in places.

Experiment 44 Duration 115 days. Dog 13L increased old dog.

Macroscopical description. There is good healing. Growth is absent in all bones. A spontaneous fracture has occurred 1.5 cm from the distal end. The general appearance corresponds to the right side although there is more evidence of degeneration.

Microscopical description. The sections stain very poorly. The articular cartilage is irregular and the nuclei take a light stain. The marrow is partly fatty and partly fibrous. The trabeculae are not arranged in a normal manner and appear degenerated in the center. The cortex shows considerable evidence of degeneration and absorption especially on its surface.

Experiment 45 Duration 208 days. Dog 3 age 4 months.

Macroscopical description. The dog removed the dressing and the wound became infected. Only a small remnant of bone is found at autopsy.

Microscopical description. The bone remnant is encapsulated by dense fibrous tissue. The bone contains well stained nuclei. At the ends and where the periosteum is absent the osseous tissue is in direct contact with the fibrous tissue. There are osteoclasts scattered between the bone and the fibrous tissue. There are some fairly normal marrow elements enclosed within the bone.

Experiment 46 Duration 98 days. Dog 6 2R age 1 1/2 months.

Macroscopical description. There is good healing. The operated bone is decreased 0.6 cm in length while the non-operated bone is the same length at the time of operation (Fig. 20). The



Fig. 8. Longitudinal sections of metatarsal bones. Side A (left) shows two implanted bones and growing absorption. Right side B shows normal growth. Wire marker indicates the original length of these bones. Growth since operation normal 0.5 cm of operated bone 0.6 cm. Note the marked absorption of the reimplanted bone.

joint-capsule shows a considerable thickening. On section the marrow cavity is found to be practically absent. The cortex is thickened and roughened.

Microscopical description. The articular cartilage is thin and in places entirely replaced by fibrous tissue. The marrow of the epiphysis and diaphysis is very scanty and of fatty type. The trabeculae of both the epiphysis and diaphysis are thick and take a poor nuclear stain. The epiphyseal cartilage line is absent. The cortex is quite irregular. In places the periosteum is absent and the surrounding fibrous tissue is closely adherent to the bone. The poor staining and appearance in general indicates a degenerative process. This can also be seen in the roentgenogram (Fig. 20).

Experiment 47 Duration 298 days. Dog 6-2R age 4 months.

Macroscopical description. The changes correspond to those found in the previous experiment. Specimen preserved in Kaiserling's solution (Fig. 20).

REIMPLANTATION OF A SPLIT METACARPAL OR METATARSAL BONE

Experiment 48 Duration 31 days. Dog 9-4 split age 1 1/2 months.

Macroscopical description. Good healing is present. There is no growth of the operated or the normal bones. The marrow is replaced by fibrous tissue and in places there is an ingrowth of osseous tissue.

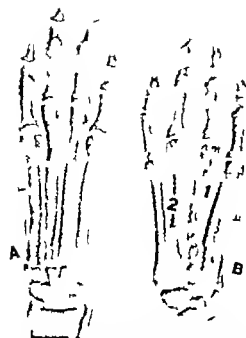


Fig. 29. Experiment 40, 303 da. s. Dog 6—age 4 months. Reimplantation of entire metatarsal bones. Right, B shows the implanted bones undergoing absorption, 6 cm. shortening since operation. A, growth of normal bones. Compare A and B with A and B in 4.

Microscopical description. The section stains poorly. The articular cartilage is of normal structure. The marrow is replaced by fibrous tissue. The trabeculae of the epiphysis show loss of their clear staining. There is evidence of the epiphyseal cartilage line. In the diaphysis there is an extensive new formation of endosteal bone. The marrow of the diaphysis is fibrous. The model of the cortex stains very lightly. There is a slight amount of proliferation about the Haversian canals.

Experiment 140. Duration, 3 days. Dog 8—age 6 months.

Microscopical description. There is no growth of the operated bone while the normal has increased 5 cm. Only remnant of the bone surrounded by dense fibrous tissue is still present (Fig. 3).

Microscopical description. The remnant of bone possesses well stained nuclei. It is surrounded by dense fibrous tissue and in a few places the periosteum is present. Scattered along the surface and in the Haversian canals are numerous osteoclasts which are aiding in the destruction. There are also some marrow-elements in the Haversian canals. In the fibrous tissue away from the main bone are some particles of degenerating bone about which are many polymorphous clear cells.

Experiment 50. Duration, 37 days. Dog 4—age 4 months.

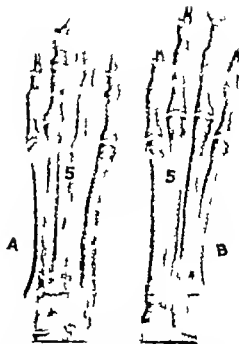


Fig. 30. Experiment 40, 1 day. Dog 4—age 6 months. Reimplantation of split metatarsal bone. Notice marked tropic of implanted bone (A). Compare with normal bone (B).

Microscopical description. There is good healing. The joint space is thickened but the articular cartilage appears to be in good condition. The bone is firm. On section the marrow appears paler than normal.

Summary on Reimplantation of an Entire Metatarsal or Metatarsal Bone

The articular cartilage undergoes slow degeneration and in some of the experiments a substitution by fibrous tissue occurs.

The marrow undergoes an early degeneration and then regeneration takes place. This regenerated marrow persisted as long as any of the other osseous parts.

The trabeculae degenerate early. Later by means of regeneration beginning at the periphery they are completely re-formed. In the more advanced stages they again show degenerative changes.

The epiphyseal cartilage line undergoes progressive and complete degeneration. There is some cartilage regeneration beneath the perichondrium at the edges but this does not persist.

HAAS TRANSPLANTATION OF ARTICULAR END OF BONE

The marrow and trabeculae of the diaphysis undergo the same changes as they do in the epiphysis.

The cortex at first degenerates and then is regenerated by new bone formed from the periosteal endosteum and about the Haversian canals. As the observation did not extend beyond 298 days it is hard to say definitely the fate of this bone but from the various pictures presented it seems as though this newly formed bone again degenerates and finally entirely disappears or only a small remnant remains.

There is always complete failure of growth after reimplantation of an entire bone.

AUTOTRANSPLANTATION OF AN ENTIRE META-CARPAL OR METATARSAL BONE

Method. The entire metacarpal or metatarsal bone is raised from its bed and interchanged with a corresponding bone of the opposite foot.

Experiment 51. Duration 36 days. Dog 1 L. split at distal end. age 9 months.

Macroscopical description. There is no growth of the operated bone while the normal increase is 0.4 cm. The joint-capsule is thickened and the cavity contains turbid fluid. The articular cartilage is rough. The distal end of the bone appears enlarged. The epiphysis is composed of a gelatinous cartilage looking material. The marrow-cavity contains soft degenerating marrow. The cortex is irregular and thickened.

Microscopical description. The joint cartilage shows a different degree of staining in the outer and inner parts. In the latter the nuclei stain poorly. There is a fibrous tissue substitution of the marrow of the epiphysis which contains collections of polymorphonuclear leucocytes. The trabeculae of the epiphysis are composed of a homogeneously stained center without nuclear stain about which is newly formed osseoid tissue. The epiphyseal cartilage line is almost entirely absent and a fissure extends through this region. The metaphyseal cartilage columns are scanty and appear to be degenerating. The marrow of the diaphysis is fibrous and the trabeculae show marked evidence of degeneration. The cortex is composed of a homogeneous non-nuclear containing tissue about which there is some newly formed bone but there is more evidence of absorption.

Experiment 52. Duration 36 days. Dog 17 R. split entire age 9 months.

Macroscopical description. The bone is 0.5 cm. shorter than at time of operation while the normal bone is 0.3 cm. longer. Joint cartilage is rough, distal end of bone necrotic and epiphysis absent.

Microscopical description. On cross section the marrow cavity is seen to be filled with fibrous tissue. The nuclei of the cortex stain poorly and the architecture is not so regular as normal. One one-third there is a considerable amount of periosteal newly formed cartilage and osteoid tissue.

Experiment 53. Duration 80 days. Dog 9. 5 L. age 3 1/2 months.

Macroscopical description. The healing is good. The operated bone is 0.6 cm. shorter than at the time of operation while the non-operated bone is 0.1 cm. longer. The marrow appears normal. The epiphyseal cartilage line is not distinguishable.

Microscopical description. The articular cartilage on one side appears fairly normal while on the other side it is practically replaced by fibrous tissue. The marrow and trabeculae of the epiphysis are normal. The epiphyseal cartilage line is almost entirely absent only a small band of ossifying cartilage is present. This band appears nearer to the articular cartilage than normal as if there is a collapsing of the epiphysis. The marrow of the diaphysis is normal. The trabeculae are normal although some contain what appears to be dead bone in their centers. The outer surface of the cortex is very irregular and eroded although the general structure of the bone is normal.

Experiment 54. Duration 80 days. Dog 10. 5 R. age 3 1/2 months inserted.

Macroscopical description. In this experiment holes are bored into the bone at various places. There is 0.5 cm. shortening of the operated bone. On section there is a large cartilaginous mass in the region of the epiphyseal cartilage line. The proximal end of the bone is smaller than normal.

Microscopical description. There is a mass of fibrous tissue extending into the joint. The perichondrium is thickened and in some places the cartilage is pierced by fibrous tissue. The cartilage that remains shows a peculiar arrangement of the nuclei and it is difficult to determine whether it is degenerating or regenerating. The marrow and trabeculae of the epiphysis and diaphysis appear normal. The epiphyseal cartilage line is represented by a thin band of ossifying cartilage at one end of which is a large amount of perichondrial fibrocartilaginous tissue which is undergoing ossification. The cortical bone is of normal structure although there is extensive erosion on its surface.

When this experiment in which holes are bored into the transplant is compared with the previous one which was left intact it is noticed that the various parts of the latter are best maintained.

Experiment 55. Duration 91 days. Dog 8. 3 L. age 6 months.

Macroscopical description. The transplanted bone is 0.3 cm. shorter than it was at the time of the operation. There is only 0.1 cm. growth in the normal bone. There is some thickening of the

joint-capsul and irregularity of th articular surface. On section the marrow-cavity is found to be occupied by cancellous bone in which are scattered marrow elements. The cortex is thickened, irregular and quit dense thus giving the bone a larger and more irregular appearance than normal.

Microscopical description. A cross section at the distal end shows an abnormally shaped marrow cavity containing fairly normal marrow. The trabeculae are more numerous than normal and in the centers of some there is degenerated bone. The cortex, the nuclei of which are well stained, sh ws a distortion of the haversian systems and about the outer surface, which is rough, are many osteoclasts. The periosteum has lost its normal appearance so that the surrounding fibrous tissue penetrates into the cortex. The proximal end is similar with the exception that the marrow is not so cellular.

Experiment 56 Duration 09 days Dog L, age 5 mo the forefoot.

Microscopical description. Only a small remnant about 1 cm long of the distal part of the transplanted bone remains. There is no growth of the normal bone.

Microscopical description. There is dense fibrous tissue surrounding the piece of bone. The bone contains mature marrow and trabeculae of normal appearance. The cortex is irregular and fibrous tissue penetrates the bone substance in some places. There are numerous osteoclasts scattered about the periphery. There is no distinct periosteum present.

Experiment 57 Duration 09 days Dog 1 IL, age 5 months, hind foot.

Microscopical description. There is no increase in length of the transplanted or the normal bones. The articular surface is rough and at its distal end the bone is fused with the adjoining bones.

Microscopical description. On cross section of the distal end there is normal piece of bone adherent to the transplant. On comparing the two, the transplant is much more irregular in outline and in arrangement of the haversian systems. The periosteum has lost its distinguishing structure and the fibrous tissue is in intimate contact with the bone. Many osteoclasts are present. The marrow and trabeculae are of normal structure but likewise irregularly arranged.

Experiment 58 Duration 155 days Dog L, old dog.

Microscopical description. The articular cartilage appears almost normal. On longitudinal section the marrow-cavity is irregular and the marrow appears paler than usual. The general appearance is one of slow degeneration.

Microscopical description. The articular cartilage is regular in outline but the nuclei take pale stain. The marrow toward the epiphysis is of this mature fatty variety, while in the diaphyseal part it is replaced by fibrous tissue. The trabeculae for the most part contain poor staining nuclei. In

the cortex the nuclei take a poor stain, excepting those immediately beneath the periosteum, where there appears to be newly formed osseous tissue.

Summary of Autotransplantation of an Entire Metacarpal or Metatarsal Bone

As far as can be ascertained from this incomplete series there appears to be more degeneration in the case of young animals than in the older animals.

In the young animals the articular cartilage shows marked degeneration and substitution by fibrous tissue. In the old animals the articular cartilage is well preserved even at 255 days.

The marrow at first degenerates and then becomes fibrous. Later it regenerates and persists for a considerable length of time.

The trabeculae degenerate at first as is seen in the 36-day experiment and then regenerate by a process of peripheral new formation.

The epiphyseal cartilage line undergoes a progressive degeneration. There is some new cartilage formed during the early stages beneath the perichondrium at either border but this eventually disappears.

The cortex at first loses its nuclear staining then regenerates and finally undergoes a slow absorption. The periosteum seems to disappear and the fibrous tissue and osteoclasts gradually absorb and replace the bone.

COMPARISON OF REIMPLANTATION AND AUTOTRANSPLANTATION OF AN ENTIRE METACARPAL OR METATARSAL BONE

The articular cartilage shows more rapid and extensive degeneration in young animals after autotransplantation of an entire bone than after reimplantation. In older animals the difference is not so evident nor is the process so rapid.

The marrow in both cases degenerates at first and then becomes fibrous and finally regenerates. The processes are about the same in reimplantation and in autotransplantation.

The degenerative processes of the epiphyseal cartilage line are the same in both reimplantation and autotransplantation a gradual complete progressive degeneration

with only a slight temporary regeneration at the periphery beneath the perichondrium.

The cortex is similarly affected in both reimplantation and autotransplantation. At first there is degeneration and then regeneration after which the periosteum loses its structure and a slow absorption occurs throughout the entire bone. Though sufficient time has not elapsed in these cases the indications are that there would be complete disappearance of the transplants if a longer period were allowed to elapse before terminating the experiment. The transplants from older animals were able to withstand the degenerative processes better than those from younger animals.

There is complete failure of growth in both reimplantation and autotransplantation of an entire metacarpal or metatarsal bone.

The splitting or incising the bone did not favor the transplantation; on the contrary it hastened the degeneration.

DISCUSSION AND REVIEW OF THE LITERATURE

Hulferich (2) in some experiments performed on rabbits in 1899 in which he reimplanted the lower epiphyseal cartilage line of the ulna came to the conclusion that the epiphyseal cartilage line under favorable conditions retained its property of producing length growth although he noted there might be a lessening of that function. Enderlin (3) who made the microscopical studies of these preparations decided that the epiphyseal cartilage line retained its vitality to a large extent. The parts near the periphery were best maintained while those at the center showed evidence of degeneration.

Zippi (4) found in autotransplantation of the epiphysis a regular healing and formation of new bone but in heteroplastic transplantation there was a complete failure.

Gakara (5) found in both autotransplantation and homotransplantations calcification of the epiphysis and complete loss of function.

Rehn and Wakabayashi (6) from a series of experiments on two-months old rabbits in which they performed homoplastic transplantation of the head of the radius concluded that the epiphyseal cartilage fully maintained

its histological structure and function after such transplantation. Their experiments are open to criticism because they do not rule out the greater growth that takes place from the distal epiphysis of the radius. In their microscopical descriptions they mention certain degenerative changes occurring in the epiphyseal cartilage line at 28, 31, 33, and 42 days after operation in which is below the normal time for ossification of the epiphyseal line in rabbits (fourth to fifth month). In the present article the results in autotransplantation are less favorable than in reimplantation. It is more than likely that the degenerative changes would be still more marked in homoplastic transplantation and that the result would be quite contradictory to those of Rehn and Wakabayashi. Obata who performed a series of experiments exactly similar to those of Rehn and Wakabayashi does not agree with their functional nor their microscopical findings.

During the same year 1912 Arhausen (7) article appeared in which he reported the results of his experiment on young rat and rabbits. He transplanted the lower fourth of the femur from a growing rat to the subcutaneous tissue of another rat. He found some degeneration of the inner layer of the articular cartilage at the sixth to twentieth day after which there was regeneration. The marrow of the epiphysis and diaphysis at first degenerated then became fibrous and at a very late period was regenerated in the epiphysis. The trabeculae at first degenerated and then regenerated. The epiphyseal cartilage line showed in the early stages a shrinking of cells and at 20 days only the peripheral parts remained alive. In the later stages aside from a slight proliferation near the periphery the entire line was substituted by fibrous tissue. The cortex showed an extensive degeneration up to 30 days but in the older stages there was considerable regeneration. In a similar set of experiments on rabbits the results corresponded quite well to those found in the rats. In another group of experiments thin sheets of articular and epiphyseal cartilage of the femur of rabbits were transplanted under the skin on the back of another animal. The marrow

was substituted by fibrous tissue except beneath the articular cartilage and near the surface. The bone trabeculae appeared to undergo degeneration with very little evidence of regeneration. The articular cartilage showed in the later stages a substitution of the dead inner layer by a proliferation from the perichondrial layer. He also transplanted the patella, either intact or split in two pieces from one rabbit to the subcutaneous tissue of another rabbit. The bone showed shrinking of nuclei at 24 days empty cells at 45, 50 and 70 days. There was an early necrosis of the marrow and complete degeneration at 24 days. At 50 days there was beginning organization which was completed at 70 days. The inner layer of the articular cartilage showed a beginning shrinking of the cells at 10 days which was more marked at 38 days. At 50 days there was some proliferation of the cells and at 70 days there was evidence of resorption of the cartilage. In the cases where the patella was cut into two pieces the cartilage showed some necrosis on the surface due to the trauma.

While the present work was being completed the following articles appeared and they will be reviewed in the order of their publication.

Von Tappeiner (8) performed three reimplantations and eight homotransplantation experiments on dogs, at the ages of one and one half and four and one half months. In the reimplantations he found no changes in the articular cartilage. The marrow of the epiphysis and diaphysis showed fibrous changes at first, after which regeneration occurred. The trabeculae at first degenerated and were then reformed. There were practically no changes in the epiphyseal cartilage line even after six months. The cortex at first degenerated and then was regenerated. There was no disturbance in the normal growth. These findings in reimplantations are entirely at variance with those of the present article both as regards the normal microscopical appearance of the epiphyseal cartilage line and the normal longitudinal growth of the bones which he reports. As his experiments were performed under exactly the same conditions it is difficult to explain

or offer any reason for such wide variation in the results. His microscopical descriptions on homoplastic transplantations correspond closely to the autoplasmic experiments described in the present paper. He ascribes some power of the epiphyseal cartilage line to increase in length even after homotransplantation again disagreeing with the findings of the author.

Obata (9) has made a very complete study of the transplantation of the epiphysis in his work on joint transplantation. He performed reimplantations, autotransplantations and homotransplantation of the metatarsophalangeal joint either with a part of or the entire metacarpal and phalanx. He found a disturbance in growth in every instance the greatest being in the case of homoplastic transplantations. The transplanted joint cartilage maintained its normal form but appeared cream white and in later stages erosions appeared on its surface. The union of transplant with the host was normal in every case except in homoplastic transplantations where there was a pseudo-arthritis. In general the above macroscopic findings agree with those of the present investigation except that Obata did not find such a marked failure of length growth in his reimplantations. In Obata's microscopical findings on reimplantation, he describes degenerative changes in the articular cartilage as early as 9 days which were more marked at 35 days then regenerative changes at 50 days and again degeneration in the middle part at 70 and 100 days. At 104 days he says it is in normal condition. It is difficult to analyze these changes and he offers no explanation for the variations in the processes. He also described a progressive degeneration of the epiphyseal cartilage line until the fiftieth day after which there occurred a partial degeneration followed by a regeneration. He ascribed almost normal functional properties to this regenerated epiphyseal cartilage line. At 70 days he described an extensive degeneration of the epiphyseal cartilage line. It is difficult to explain the discrepancies in his findings in that there was an extensive degeneration at 35 and 70 days while at 50 days the cartilage was so well maintained. It is possible that

under some especially favorable circumstance the transplanted epiphyseal cartilage line did not undergo the usual rapid degeneration as in the other cases. In comparing Obata's findings on reimplantation with those of the present work there is a considerable uniformity except that he describes extensive degeneration of the articular cartilage while in these experiments the articular cartilage proved to be the most resistant of any of the transplanted tissues. This difference might be due to the fact that he transplanted the entire joint with the intact capsule which perhaps prevented the early inflow of nourishing fluids as is possible in the case where only one half of the joint is utilized. Neither is there an agreement as to his statement that the epiphyseal cartilage line can regenerate so as to continue the length growth of the transplanted bone. In the autotransplantation he likewise describes much more extensive changes in the articular cartilage than is found in the present work. Otherwise the changes correspond fairly well to the changes that are described in this series of experiments. In Obata's homoplastic experiments he found changes to be more extensive in the cartilage than in reimplantation or autotransplantation with very little evidence of regeneration. There was also less tendency to regeneration of the marrow trabeculae and cortex. In case of non related animals the degenerative processes were more rapid and extensive. In the homoplastic transplantation of the head of the radius he found the same degenerative changes throughout the transplant as in the other cases. The epiphyseal cartilage line underwent a progressive degeneration with practically no regeneration. Thus he does not agree with Kehn and Wakabayashi who performed similar experiments and described complete retention of structure and function of the epiphyseal cartilage line.

Heller (10) performed reimplantations and homotransplantations of the distal epiphysis of the ulna of rabbits and goat. He found the least amount of shortening in reimplantation while the greatest amount was in homoplastic transplantation in non related animal. He concluded that a practical use

of the epiphyseal cartilage line with a more or less large piece of bone attached could not be utilized in reimplantation and certainly not in homotransplantation. He said that in reimplantations there was some regeneration of the epiphyseal cartilage line and a not in considerable amount of bone apposition but nevertheless the bone growth was retarded. In homoplastic transplantation he found some perichondrial regeneration but that there was no tendency for a physiological utilization of this in the epiphyseal cartilage line. The larger the animal the less favorable were the results and the more rapid and extensive the resorption even to complete disappearance of the transplant. He predicted that it might be possible by using very thin pieces of the epiphyseal cartilage line to obtain some successful result and in a short note at the end of his article intimated that he had obtained favorable results by the use of thin sheets in autotransplantation. The finding of Heller agrees fairly well with those described in this paper except that he reports more or less growth after reimplantation. The use of the distal end of the radius and ulna on account of the bending of the extremity does not offer so favorable an experimental method as does the use of the metacarpal or the metatarsal bones.

Minoura (11) transplanted the metatarsophalangeal joints either intact or split longitudinally of two months-old rabbits into the back subcutaneous tissue liver or abdominal cavity of the same or different animals. In some cases the joint was placed in Ringer's solution before transplantation or was removed from a dead animal. These experiments do not correspond to those of the present work because the transplant was placed under unnatural conditions but on account of a certain agreement of the early histological changes they will be reviewed. He found that the transplanted joint became encapsulated by the tissue of the host and that the healing was always the same whether it was in the muscle subcutaneous tissue or abdominal cavity. In the longitudinally split bone the organization took place more quickly than in the entire bone and there was little difference in the processes if the joint was

allowed to remain in Ringer's solution before transplantation. The joint cartilage remained intact for a considerable time and always showed a cartilage-cell regeneration on the periphery. The marrow degenerated and was substituted by fibrous tissue and later by fat. The trabeculae of the epiphysis degenerated and later were substituted by new formed bone which however was not permanent. The epiphyseal cartilage line underwent necrosis and absorption only the parts of the proliferating zone near the periphery showed multiplication of the cartilage cells. The periosteum always showed new bone formation in the inner layers but the new formed tissue finally underwent absorption. In these experiments there was no possibility of the bone of the host playing a part in any of the regenerative processes. The findings agree very well with those of the present work except that in Minoura's experiment there was not the extensive regeneration and there was a lack of permanency of the new formed tissue. Thus it shows that there are certain regenerative processes that can take place in a transplant without the aid of the host, but in order to have lasting qualities some additional elements from the host are necessary. The changes in homoplastic transplantation were similar to those of autotransplantation although they were not so marked nor so permanent. In none of the experiments was there any increase in the length of the bone after transplantation.

Gill (12) reports eleven experiments performed on full grown animals in which he made autotransplantations of the entire metatarsal bones. Infection occurred in most of his experiments but in spite of that fact, he says five of the transplanted bones were practically normal at the end of eight months. He found no evidence of dead bone on microscopic examination in these experiments in which there was only slight infection. In comparing Gill's results with those of similar experiments in the present paper there is a considerable variation in the findings. In practically every case in the present experiments there was macroscopic and microscopic evidence of degenerative changes after the transplantation of an entire

bone. The changes took place earlier and were more extensive in the young animals.

SUMMARY

1. The epiphyseal cartilage line ceases to functionate after reimplantation and autotransplantation either when transplanted by itself or with a small or a large piece of adjoining diaphyseal or epiphyseal bone or even when transplanted as an entire intact bone. The longitudinal growth ceases in every case. The first change after transplantation consists of a fragmentation of the cartilage columns near the epiphyseal ossifying layer. Later there is a disappearance of these cells. Then there is fibrous substitution of the remaining parts, and finally ossification occurs as in the adult animal. The only evidence of regeneration is near the periphery beneath the perichondrium which part seems to retain its property of producing cartilage. This new cartilage possesses none of the length-producing functions of the normal epiphyseal cartilage line. The epiphyseal cartilage line is the least transplantable of any of the components of bone.

2. The articular cartilage undergoes practically no changes after reimplantation. In autotransplantation there occurs at times evidence of degenerative and regenerative changes. In some of the experiments of longer duration there is a partial substitution by fibrous tissue. The articular cartilage offers the greatest possibilities of successful transplantation of the various parts of a bone.

3. The marrow of the transplant appears to undergo an early complete necrosis. It is possible that some of the cells persist because of better conditions for nourishment, or have a greater resistance and are later the source for the regeneration of the marrow. After the necrosis of the marrow the spaces are filled with fibrous connective tissue. At a still later period scattered marrow-cells are found in the fibrous tissue and there is then a gradual reformation of the marrow. The exact method of regeneration cannot be definitely determined. Whether it bears any relation to the newly formed capillaries or arises from the persisting marrow-cells of the transplant, is difficult to ascertain.

4 The trabeculae show early evidence of degeneration as is indicated by the loss of staining property of the nuclei. The first indication of regeneration is seen on the periphery where a layer of osteoblasts are found. The later stages show a proliferation of these cells to form osteoid tissue which gradually replaces the old bone to form the new trabeculae. It is impossible to determine definitely the origin of this new tissue but it is probable that the osteoblasts on the surface of the trabeculae on account of better conditions for nourishment have persisted and with the re-establishment of the capillary blood supply are able to proliferate and re-form the bone or they might bear some relation to the fibroblasts. The process is the same in both reimplantation and autotransplantation of parts of bone or entire bones.

5 The cortex shows an early loss of nuclear staining. Later there takes place a new formation of osseous tissue from both the periosteum and the endosteum and with a limited amount of new osseous tissue in the region of the haversian canals the cortex is completely regenerated. Even in the transplants that are in contact with the bone of the host the new tissue is formed independently of that source. It seems as though this new bone is lacking in some property by which it may continue to exist and in order to endure some additional stimuli or osseous elements are necessary to establish the permanency of the transplant. This additional factor might be in the nature of certain stimulating fluids from the normal bone or an emigration of definite osseous forming cells.

6 Following the first operation in the two stage autotransplantation of the epiphyseal end of a bone there is a considerable disturbance in the function of the epiphyseal cartilage line even though the epiphysis is not separated from the surrounding tissue. The loss of growth is most likely due to the interference with the main vascular supply from the diaphysis to the epiphyseal cartilage line. After the second operation in which the epiphysis is separated from the surrounding tissue and the epiphyseal vessels destroyed there is a complete cessation of growth. The loss of function occurs in spite of the

fact that the transplant is united to the host and that a part of the diaphyseal blood supply is re-established. The importance of the direct vascular supply to the epiphyseal cartilage line is forcibly demonstrated in this experiment.

7 The vitality of the various components of bone after transplantation is directly related to the ability of that part to withstand the loss of its vascular supply. The least dependent the part is upon its blood supply the greater is the possibility of a successful transplantation as in the articular cartilage while on the other hand the more dependent the part is upon its vascular connection the less likely is the possibility of a successful transplantation as in the epiphyseal cartilage line.

8 From these experiments and the results in general on transplanted bone the following conclusion is offered regarding the fate of bone after transplantation. Although each part of transplanted bone possesses the power to regenerate independently and without the aid of neighboring bone the autonomous newly formed tissue does not possess that property which is necessary for a continued existence and it will ultimately entirely disappear. Some additional stimulus is needed and such conditions are only obtained when the transplant is in direct contact with normal growing bone. Therefore when there is failure of such connection the transplanted bone at first shows evidence of regeneration but it a sufficient time allowed to elapse it will ultimately entirely disappear. However if it is united with the cut surface of normal bone it will continue to live because certain necessary additional stimuli and new elements will be supplied by the host. It is possible that certain chemical or physiological stimuli are supplied by the living intact bone after which the regenerated bone on account of these additional factors is able to persist permanently. Undoubtedly some definite osseous elements from the bone of the host invade the transplant and either replace the temporary bone or give to it certain requisites for its perpetuation. Although function may play a factor in the development of bone it is not of prime importance in determining the permanency

of that tissue. The differences of opinions of the various investigators is in part due to the failure to allow sufficient time to elapse before drawing final conclusions, as well as to take into account the influence of different environmental conditions on the transplant from both young and old animals.

In conclusion, I wish to extend my thanks to Professor Ophuels, of the Pathological Laboratory under whose guidance the above work was performed, for his interest and suggestions also to thank Professor Blaisdell of the Surgical Laboratory for his assistance in the operative work.

Since this article was submitted for publication the following paper has appeared: *Neue Experimente zur Frage der homoplastischen Transplantationsfähigkeit des Epiphyseknorpels und des Gelenkknorpels*. He gives the results obtained from sixteen homoplastic transplantations performed upon the upper epiphysis of the radius of rabbits. He reports two successful instances one of which was not only anatomically but physiologically efficient. He is unable to explain the variation in the results, but suggests that it might be on account of the less poisonous reaction of the body fluids. Like all experiments on the upper epiphysis of the radius they are open to criticism and a careful an-

alysis of his descriptions are not entirely convincing as to the absolute success of these experiments.

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TRAUMAS OF THE BACK AND SPINE

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IN my experience with traumatic surgery I have met with no more interesting series of cases than as represented by the title of this paper and having frequently to pass judgment upon the seriousness of such injuries, the responsibility attached there to is not always a light one. The actual conditions present are often so veiled by exaggerated imaginary or simulated symptoms that one must be very careful in making a diagnosis and prognosis not to overlook or underestimate serious injuries or to consider too seriously the minor ones.

This paper is based upon the records of 758 cases. Of these, 51 were under my personal observation while the balance are collected from my file of reports from men associated with me in railroad surgery. I have been in close touch with the conditions in all of the cases so reported have received frequent reports in the more serious ones have examined many of them and have been able to direct the line of treatment. The list includes only those injuries which have been diagnosed as a contusion or sprain, together with their complications. No cases

are included except where the period of disability has exceeded one week and I have also excluded all cases known to be complicated by a fracture or dislocation.

By a contusion we mean those direct traumas received either over the spine itself or as more frequently happens to one side of it and involving the muscles and other soft tissues of the back. Looked upon by many as injuries of minor importance from which the victim promptly recovers they are nevertheless in some instances serious in character and the disability produced is an extended one.

The contusions are included with sprains because it is almost impossible at times to distinguish one from the other particularly so when the contusion has been directly over the spine. In those cases not seen by me I have a rule accepted the diagnosis as made by the attending surgeon but my personal experience with this class of cases leads me to believe that the diagnosis has been in correct in many instances and that cases reported as contusions are often sprains and some of the so called sprains are no more than contusions.

In contusions the trauma varies from a moderate bruising of the soft tissues to a laceration of the dorsal muscles a stretching or tearing of muscular attachments to the spine injury to spinal nerves and injury to internal organs as the kidney. In the milder cases there may be no external evidence of an injury while in more serious ones there will be a swelling with or without discoloration and large deeply lying hematomata may form from extravasated blood and serum. Rarely a groove or depression may be felt between divided muscle bundles.

From a total of 74 cases 83 or 9 per cent were located in the lumbar region 45 or 16 per cent in the dorsal region and 10 per cent occurred in both the dorso-lumbar and sacral regions. In 62 or a little over 20 per cent the location was not specified and from the figures above it is proper to assume that a majority of these occurred below the dorsal region. A period of disability in the mildest cases in this list averages from two to three weeks while a disability of from two

to three months is not at all uncommon. Contusions in which recovery is more delayed and which run from four to six months or a year have some complication as sprain a possible fracture nervous symptom or there is intent on the part of the patient to try and secure a large settlement.

A sprain may be considered a bending or twisting of the spine and a stretching of the spinal muscles and ligaments to a point beyond their physiological range of motion. Constructed and supported as it is the spine will withstand a considerable amount of jarring and bending without symptom of injury following. Its elasticity is dependent upon the articulations between the vertebrae the intervertebral cartilaginous discs or buffers the spinal and intervertebral ligaments and the spinal muscles. The elasticity and pliability present lessen very materially the shock produced by all kinds of traumatism. The cord itself is further protected against injury by being suspended within the spinal canal covered by its layer of membranes and the cerebrospinal fluid and supported to a further extent by the spinal nerves. The space between the dura and the walls of the canal is filled with loose cellular tissue and the venous sinuses. The cord can therefore be injured only by a narrowing of the bony canal as by fracture or dislocation by hemorrhage within the canal or in the cord itself or produced by a shock or strain of some character. From the latter cause arises the condition described as spinal concussion a trauma defined by Dr. Murphy as an impairment or loss of function of the spinal cord due to an injury which is not sufficient to produce gross anatomic changes. Though denied by many surgeons I am convinced that this condition does not infrequently occur as a result of some contusions and direct sprains.

Sprains are the result of either a direct or an indirect force. They occur directly as in contusions from a fall or blow and indirectly from falls upon the feet or buttocks from carrying heavy weights upon the head or shoulders from jumping slipping twisting of the spine and from over exertion in the act of lifting pulling or pushing.

The spinal muscles are undoubtedly at fault in a large number of the cases, about 80 per cent as near as I have been able to estimate, while the articulations and ligaments are involved in the remaining 20 per cent. This relative proportion is probably due to the fact that many of the more severe sprains are often complicated by a fracture and such cases are classed as fractures. The sprains have been grouped according to their origin from direct or indirect causes it having been found impossible to separate satisfactorily those involving only the spinal muscles from those affecting also the articulations and ligaments. One point of differentiation which cannot however be too much depended upon is that pain upon straightening the spine indicates a muscular involvement while pain in bending the spine indicates involvement of the ligaments. Although the mobility of the spine is greatest in the cervical region where the vertebrae are smallest and there is less muscular protection to them sprains occur most frequently in the lumbar region where the vertebrae are larger stronger and more protected.

Out of the 481 cases classed as sprain 420, or 87 per cent, were due to indirect causes and of these 200 or 47 per cent involved the dorso-lumbar and lumbar region. Of 61 cases due to direct trauma, 29 or 47 per cent involved the same region. If we add to these a proportionate number of those cases in which the locality was not specified we have involving this region 58 per cent of all the cases. Cervical sprains the next in frequency were reported but 31 times, twice as due to direct and 29 times from indirect cause. Direct contusions and sprains in the region of the coccyx were reported 20 times and a few of those developed a coccydynia which persisted for months. Those sprains involving the muscles alone are usually caused by lifting pulling or pushing too heavy weights carrying loads upon the head or shoulders, or due to a sudden twisting of the body as from slipping. The ligamentous sprains are usually the result of a fall upon the feet or buttocks or upon the back and shoulders. Numerous cervical sprains have occurred in sleeping cars, where as a result of sudden stopping of

a train one has been thrown up against the head board of the berth thus causing a forced flexion of the head.

The symptoms in contusions and sprains are similar and as has been stated one cannot always be distinguished from the other. In the milder cases there is localized pain and tenderness with some muscular rigidity more marked on one side of the spine in contusions and involving both sides in sprains. In both the pain is much less when the back is kept at rest and is increased by all bending or twisting movements. There is more muscular rigidity or muscular spasm in sprains this being Nature's method of enforcing rest to the strained ligaments and articulations. Some of the rigidity is voluntary from fear of pain as has been described by Page. The patient assumes at all times the position which gives him the greatest relief from pain and in all attempts to rise from a sitting position or in lying or sitting down uses the arms and legs to assist in the movement while holding the back very rigid. The reflexes of one or both legs are usually increased. Hyperaesthesiae and paraesthesiae are often present. Disturbances of the bowels and bladder are not infrequent in both contusions and sprains. In this series 22 patients complained of increased frequency or inability to urinate and in 17 cases bloody urine was passed for from a few hours to several days. Eighteen cases involving the lumbar and lumbosacral regions complained of particular pain over one of the sacro-iliac articulations.

Contusions and sprains are frequently so complicated by other symptoms of nervous disorder paralyses, etc. that our chief concern may be regarding the complication rather than injury itself. In the series 27 cases developed a traumatic neurosis 3 developed hysterical paralyses one a traumatic spondylitis and an epileptic convulsion occurred in one case one month after an injury to the back though the previous history was entirely negative. Eleven cases were classed as malingerers. Two cases suffered from hemorrhage one extradural and the other within the cord as a result of strain due to lifting.

The period of disability in sprains averages

longer than with the contusions. The muscular sprains are usually recovered in from two to three weeks. The milder ligamentous sprains disable one from four to six or eight weeks while the severe type will average from four to six months. In some cases pain is present off and on for several years. Those complicated by a traumatic neurosis average from six months to a year or longer.

In making a diagnosis great care should be taken not to overlook a more serious injury, as a fracture or dislocation. This has been done in a number of cases of which I have record. X-ray plates must be obtained in all doubtful cases and these will at times show a fracture or other lesion which cannot be positively demonstrated in any other way. Owing to the great danger in handling a patient suffering from fracture or dislocation we must exercise great care in conducting the examination. A valuable point in differentiating sprains from dislocations particularly in the cervical region is that in sprains all the normal movement can be obtained though very painful while with a dislocation certain movements are not possible but the effort to make them is not particularly painful. For this reason all manipulative movements should guard against the danger of inflicting more damage to the cord structure in case a dislocation or fracture is present. The necessity of such care is emphasized by a case reported to me several years ago as a sprain of the back. Several days after receiving the report a supplemental report stated that upon attempting to turn the patient upon his side in order to make a more careful examination a sudden marked deformity occurred due to a fracture dislocation at the level of the seventh dorsal vertebra. No difficulty should be met with in diagnosing the ordinary contusion or sprain but many errors are made in separating the muscular from the ligamentous sprains.

The prognosis depends upon the actual injury sustained and the complications which arise. The period of disability is no true index to the severity of the injury and nervous symptoms may be present in minor as well as severe cases. One must ever be on the lookout for malingerers or damage

seekers. The settlement of a claim for damage often has a most beneficial psychic effect upon a patient and recovery takes place rapidly though there may be nothing in the case to suggest an intentional exaggeration of symptoms.

I shall make no attempt to describe treatment of these cases in detail. Contusions should be treated the same as when they occur in other regions. In general the treatment of sprains depends upon whether the muscles are at fault or if the ligaments and articulations are also involved. Those cases in which the muscles alone are affected should be given rest for a few days followed by massage and a gradually increasing amount of gymnastic or setting up exercises. The ligamentous sprains require rest and the spine should be supported by adhesive strapping or other more effective means to secure this. Except for pain and tenderness at first massage and moderate exercise of a strained muscle or group of muscles should give relief but if after such a treatment the pain is increased and no temporary relief is felt then we should assume that the ligaments are involved and treat accordingly. Complications should be treated according to their symptoms. Environment sympathy of friends and members of the family, visions of permanent disability or invalidism, business worries, etc., all tend to bring on or increase nervous symptoms and thus delay recovery.

ILLUSTRATIVE CASES

Spinal concussion. CASE 1. L. J. G. switchman injured December 2, 1903, account of being thrown from the top of a box car to the ground and striking upon the back and right shoulder. Was unconscious for five to ten minutes. When examined at the hospital he was unable to use the right arm and could not move either leg. Sensation not disturbed and reflexes present but slightly exaggerated. Slight motion returned in legs in a few days and by January 11, 1904, he was able to return to work.

CASE 2. J. G. switchman age 48 injured April 17, 1910. On account of defective grab iron he fell from the side of a box car to the ground striking upon the back. Symptoms as reported were a motor and sensory paralysis of the arms and all below the level of the first dorsal vertebra. A report of May 1, stated there was a little return of motion in one hand and returning sensation in the other also a little motion in the legs.

The reflexes were also returning slowly. Bladder and rectum still completely paralyzed. Three X-ray plates were all negative as to fracture. Diagnosis made was hemorrhage into the cord cervical region, followed by transverse myelitis and due to severe spinal concussion. The patient died May 29 1910.

In speaking of isolated injuries to the cord without injury to the spine, Leyden states that from concussion a paralysis may follow at once or soon and may be fatal. The cord shows itself to be lacerated together with free hemorrhage or extravasation of blood in the vertebral canal or it may show no gross or microscopical changes. The real changes he states, are probably a direct traumatic necrosis of axis cylinders. If a patient lives recovery may follow quickly but in all cases where an effusion of blood has occurred a chronic myelitis is to be feared.

C. Injuries with paraplegia. CASE 3 H R W brakeman single, age 26 injured March 1903. While standing in the open door of a baggage car he fell backward out of the car and struck upon wood rail protecting some signal wires. He was taken home and I saw him within the next hour or two. He had a severe contusion over the region of the left kidney and was suffering from intense pain in the back. The first urine passed following the injury contained a considerable amount of blood and continued to contain blood for several days after which it became clear. He returned to work in about six weeks, but pain continued off and on for a number of years.

CASE 4 M C laborer age 35 injured August 1909, account of falling from a gravel car to ground and landing upon his back. He was taken to the hospital by ambulance and remained in the hospital under my care up to April 1910 then was kept under observation until May 1910. Examination showed contusions all along the back and spine. Pain was most severe in the muscles on the left side. Hyperaesthesia present from the mid dorsal region downward. There was a spastic paralysis in both legs, more particularly the left, and a marked increase in all the reflexes. No bowel or bladder disturbance was present. Improvement was very slow but more in the right than left leg. On January 1911 examination of right leg showed muscular spasticity still present reflexes exaggerated but ankle clonus diminishing no Babinsky sensation nearly normal. The left leg showed more muscular spasticity and very much diminished voluntary movements of the leg due largely I felt to fear of increasing pain in the back. All bending movements of the spine were avoided as much as possible. X-ray plates were negative. Not entirely satisfied with the slow recovery and fearing that

a more severe injury had been overlooked I had him examined by D J B Murphy on February 13 and my diagnosis of contusions of the back with some sprain was confirmed. Our line of treatment was unchanged but the amelioration was followed by more rapid recovery than at any other time due to the improved mental condition of the patient. With the added assurance that no serious injury was present he made more effort to get around and soon found that the increased activity did not increase his pain but rather lessened it. He reported back to work about June 1910.

Sprains of the lumbar vertebrae followed by spinal hemorrhage. CASE 5 J J freight handler age 35 injured October 1905. While engaged in lifting a heavy casing he experienced a sensation of something giving way as he spread it something snapped in the back. He was at once disabled and was taken home where he remained without medical attention until the 31st when he came to my office for examination. He complained of pain over the third fourth and fifth lumbar vertebrae and especially at the point where the spine crossed below the level of the iliac crests. He had had no bladder or rectal disturbance and there was no motor or sensory disturbance in either leg but the pain in the back had been continuous. His symptoms were all subjective and there were no objective findings upon examination. The diagnosis was muscular sprain and he was instructed to do no certain muscular exercises and given massage treatment for two weeks. He reported November 1905 that he was much improved and intended returning to work in a few days.

CASE 6 F W H tire agent age 34 married, injured August 1907. Previous history negative. While in the act of lifting a heavy propeller blade he experienced a sensation of something giving way and of an immediate weakness in the lumbar region and through the hips. He rested for about half an hour then resumed work, but did not attempt to do any heavy lifting. He experienced no unusual symptoms that night and was at his office the following day. He had no real pain, but did not feel right. He went to the White City park that evening and spent several hours walking about. He slept well that night and had no uncomfortable symptoms. The following day the 20th, he was at the office and did some work at the warehouse as on the 24th. He was restless that night and did not sleep much, but was not painful. The next day the 27th, he did not feel right but spent all day at the office. That night he could not sleep or rest in bed on account of pain across the lumbar region of the back and distressed feeling through the hips, and he walked the floor until about 6 a.m. the following morning. About this time the pain became less and, feeling very tired and weak, he went to bed and slept for about two hours. When he awoke he was unable to get up on account of a complete motor paralysis of both legs. Called in day or two later I found upon examination a motor paralysis of both

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legs but no marked disturbance of sensation. The patellar and plantar reflexes were absent. There was no ankle jerk and no Babinski reflex. There was no involvement of the bladder or rectum except for slightly diminished sensation which returned to normal within the next week. Examination in February 2, 1908, showed improvement. The muscles of the legs were greatly atrophied but had retained some size through the use of massage and electricity. It was noted at this time that he felt a little more strength in the muscles in the anterior surface of the right thigh but there was no comparison. There has been no material improvement since then. He still has a complete paralysis of both legs but retention of the bladder and rectum. Sensation is practically normal. I have never been able to satisfactorily elicit the reflexes in this case but believe to be located in the cauda. The most interesting features of the case are the equal involvement of both legs below the level of the lumbosacral ligament with loss of sensation of bladder and rectum and the presence of practically normal sensation.

CASE 9. W. C. Smith, harness maker, injured January 5, 1910. In letting go of a heavy piece of iron which he was lifting he felt a sudden pain in the chest and back. He was almost immediately disabled and when examined at the hospital was found to have a motor and sensory paralysis of both legs and of the bladder and rectum. He complained of severe pain in the spine. Two days later sensation and some motion returned to the right leg but the left was unchanged. February 11, it was reported that sensation was normal in the right leg but that there was less motion than a week before. Anesthesia on the left side extended nearly to the lower border of the scapular arch. I examined the case February 10 and found both legs paralyzed but sensation present in the right. All the reflexes were absent except the plantar reflex in the right leg. Bowel movement was involuntary and there was incontinence of urine. The bed men were his distant land and right from the outer margin to the hips, both sensation and being present at times and absent at times. Later there was more loss of sensation in the left side. He stated that he could move the right leg some the first day after injury but not since then. No muscular atrophy was present at this time but there were a number of small local ecchymoses. On March 1, sensation was present in the whole right side and some extent in the left foot. There was a little return of motion in the left foot. The symptoms improved slightly from then on but he gradually lost weight and strength and finally died July 16, 1910. The diagnosis in this case was extradural hemorrhage due to sprain from lifting.

SPINAL TRAUMA WITH LOCAL SYMPTOMS
CASE 10. F. W. Witham, glass injured November 20. Admitted to hospital on account of injury to the lumbar region. He stated that he had been carrying a heavy box on his back and that he had been

healed and talked at random. No paralysis was noted. On November 22 he sat up in bed for the first time and was up each day until the 6th when he complained of feeling bad again and remained in bed. Later in the day he got up and left the hospital. I next saw him on January 4, 1908. At this time he claimed to have been struck in the back by a tree trunk and knocked down. He was brought to the hospital where upon examination we found a complete left-sided paralysis and some limpity. He felt no pain at times. Motion returned in the right leg the next day and the remaining symptoms cleared so that he was up on the 14th. He was discharged from the hospital January 15. The same night I was called to see him in another hospital on account of an injury sustained through being struck by an engine. Examination at this time revealed a complete motor and sensory paralysis below the level of the fourth lumbar vertebra. There was rectal anesthesia and retention of urine for several days. No loss of reflex. Complaint of diplopia for first 4 hours also complained at times of an unnatural feeling in the hind foot. Expressing a desire to go home we put him in a stretch and on a train bound for Ohio with out waiting for his recovery. I next heard from him on account of an injury received November 1908. He was in a hospital in Ohio suffering from a paralysis of both legs due to railroad accident. The attending surgeon learned of two more alleged injuries between January and the one of November and while making an examination of one of the paralyzed feet stuck a needle well into the foot. This met with a shout of pain and upon being ordered to get up and leave the hospital the man promptly died. A man answering the same description and of the same name was picked up and taken to a hospital in Canton, Ohio on December 12, 1908, where it was reported he was completely paralyzed from the hips down. I did not hear the outcome of this attack. This man undoubtedly was suffering from a hysteroneurosis the paralytic attacks being easily precipitated by a slight injury to the back and this knowledge was being used by him to defraud corporations.

CASE 11. J. M. E. Hostler injured October 3, 1908. He was reported to me as having been struck in the back by a baggage truck and knocked down. Examination showed a complete paralysis from the hips down with no local evidences of any injury. The diagnosis was hysterical paraplegia. He recovered sufficiently to leave the hospital two days later. The history of this case developed that he had been treated for the same condition on numerous other occasions following falls from the cars or railroad tracks and once from shaking the grates in an engine.

CASE 12. Mrs. N. C. House injured February 1910. Claimed that a sudden top of a train threw her back against a set and injured the back. She had severe pain in the back and down the right thigh. She was taken to the hospital in a

negative. She was examined by a neurologist, who found nystagmus, exaggerated reflexes, ankle clonus, and loss of corneal and pharyngeal reflexes. Diagnosis: traumatic neurosis of hysteroid type.

CASE 1. A. E. L. merchant, age 35, injured February 2, 1903. Claimed to have been lying in berth when sudden stop of train threw him up against head of berth, causing contusion of head and sprain of muscles of neck. A neurologist in Cleveland who examined him the day of the injury found no motor or sensory disturbances, no inco-ordination, normal reflexes, and no objective signs of injury. The man stated he felt all right until some hours after the injury. Subsequently he was examined by seven or eight prominent surgeons and neurologists on account of pain in the neck and the usual nervous symptoms found in a traumatic neurosis. In all cases the diagnosis was the same. This man was still complaining for more than a year following injury.

Fall cases. **CASE.** O. W. helper injured September 20, 1909, by falling into a pit. Was

picked up unconscious. He sustained a severe contusion of the spine over the upper dorsal region. Confined to hospital up to October 22. A report under date of November 1 stated that the man walked well with use of a cane for two weeks after he left the hospital, then began using crutches and complained very much of pain in the back. The case was settled shortly afterward and four days later the man discarded his crutches and desired to resume work.

CASE 3. T. E. L. conductor, age 43, injured April, 1903, through fall from the top of a car to the ground. He complained of pain in lumbar region, but no mark of injury was found on examination. He consulted several different physicians about his back but on May 1 was examined by a neurologist, who stated that the man was either a poorly instructed malingerer or he might have a traumatic neurosis with marked exaggeration of signs and symptoms. This case was settled, and immediately after the man went on a drunk lasting three days.

ABDOMINAL PREGNANCY

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ABDOMINAL pregnancy which may be defined as the development and growth of the foetus in the abdominal cavity may be either primary or secondary. The fact that primary abdominal pregnancy may occur is denied by some authorities although Parvin (1) gives Kleinwachter's explanations of its occurrence as follows:

1. The ovic sac may rupture so far from the ampulla that the current caused by the movement of the cilia cannot carry the ovule into the tube.

2. A temporary abnormal position or movement of the abdominal organs may obstruct the passage of the ovum.

3. The end of the tube may be completely closed in consequence of former inflammation, and the ovule be impregnated by semen coming through the other tube.

4. The tubal orifice may be so narrow that while permitting spermatozoa to pass, the ovule enlarged by impregnation cannot pass.

5. The tube may have lost its cilia from disease and the current fall so that the ovule is not carried to the tube.

6. Old exudations or pseudomembranes may either obstruct the orifice of the tube, or be in the way of the ovule reaching the orifice.

7. Abdominal pregnancy may occur when both tubes are normal. The ovule impregnated at one tube may pass out into the abdominal cavity and then cross to the other tube but the latter will not admit it because meantime the ovum has become too large.

This last is certainly a most ingenious explanation. The condition may also arise from an ovum escaping through the scar following a caesarean operation or through the fistula in the cicatrix of a cervix remaining after the performance of subtotal hysterectomy. With all these possible explanations it seems difficult to exclude the occurrence of a primary abdominal pregnancy. There are very few definite cases reported. Among them those of Béhier (2) and Calloway (3) bear close investigation. Many experimenters on animals prove from their experiences that primary abdominal pregnancy is to be considered a very possible occurrence. Blair Bell (4) concludes that because it is common in a rabbit

anesthetic, I asked Dr. Glenn, consulting gynecologist to the hospital, to see the case with me. He agreed it was impossible to diagnose definitely that there was some marked abnormality and that the best policy was to open the abdomen.

To touch on these diagnostic points of the case in comparison with those points which I was able to gather from my study of the subject.

- 1 Sensitiveness was present though not extreme.
- Intermittent contractions were not noticeable. This does not seem to be a very distinguishable sign for while these contractions are valuable diagnostic points when present their absence does not contraindicate pregnancy.
- 3 There was marked irregularity of outline.
- 4 The child was not directly under the skin.
- 5 Heart-sounds were not directly under ear.
- 6 Retroversion was present.

On January 8 I opened the abdomen by a medial incision from the symphysis to 6 inches above the umbilicus. A tumor hemorrhagic in appearance stretching a little beyond the umbilicus was seen. In separating the adhesions of the tumor which were numerous and were chiefly to the intestines, omentum, posterior pelvic wall and uterus, in the left iliac region the finger entered the sac and a fresh fetal foot was extruded. There was some old blood on the right side and there was much fresh hemorrhage from the separated parts of the sac. It was necessary to remove and dissect off omentum in several places while the rectum for two or three inches required overlying where the placenta was removed. There were several pieces of tissue removed during the operation which consisted possibly of some kind of sac. While the operation was in progress the patient was given saline subcutaneous pituitary extract 2 cc., strychnine sulphate, gr. 1/3 etc. When the fetus and placenta had been removed it was apparent that the right tube had been taken away from the mass. The uterus left tube and both ovaries were left *situ*. The diagnostic difficulty was here made apparent for the uterus lying retroverted without retroflexion was practically imbedded in the mass which filled the pelvis. It was impossible to investigate further for the patient was much blanched, was pulseless, the period of the operation and it was necessary to close the abdomen as quickly as possible and to get the woman to bed where continuous rectal saline and other usual restorative measures were carried out. On the sixth day cystitis developed which persisted for seven days. On the fourteenth day she passed per rectum a wash leatherlike piece of material which Dr. Wigham reported to be cast of the rectum. This phenomenon was marked proof of the irritation to which the bowels had been subjected. The long abdominal wound healed by first intention and she was discharged from the hospital in good health on the twenty-sixth day.

The history of the treatment of abdominal pregnancy is interesting. Firstly there were

the days when the condition was always found post mortem. Next when treatment was postponed until after the death of the child (19) or when the child was removed and the placenta left (20, 21, 22). In those days gynecologists were vying with each other to find the best infanticide. Barnes (23) injected into the sac atropine and strychnine. Friedrich (24) morphine while Thomas, (25) and many others were using the electric current. Barnes inoculated the mother with syphilis to kill the child. Generally speaking the results of these measures were disappointing.

The pathological report does not throw much light on the subject. The specimen consisted of a 5 to 6 months fresh fetus and placenta. On the maternal surface of the placenta is seen an area which on microscopic examination proved to be blood-clot and which probably is the place where it was implanted on the rectum. Sections from various sites showed nothing abnormal. A search was made for tubal tissue but none could be demonstrated. Much omentum was removed and a microscopic examination of portions of this failed to show the presence of decidua cells. Outerbridge (26) has proved that decidua like cells are found in the omentum in cases of intrauterine pregnancy. This has been noted by Schmorl (27), Kinoshita (28) and Shaviodskundis (29). They have also been found on the peritoneum covering the posterior surface of the uterus, the anterior wall of the rectum, in the appendix (30) in a parovarian cyst (31) and in the vagina (32). It is strange that in my case there was no decidua reaction in the omentum removed.

The most probable explanation of the case is as follows. That there was a very slight rupture of the tube at 2 to 3 months that the ovum remained attached partially to the tube and that as it grew the placenta attached itself to rectum, omentum, and posterior pelvic wall etc. that this caused irritation which predisposed to a connective tissue proliferation thus surrounding it with a vascular sac. The patient evidently sought Dr. Ryan's opinion shortly before the time I first saw her on account of the pain caused by the enveloping sac which was much stretched, this latter fact was clearly demonstrated during the

operation. If no operation had been performed what would have been the result? She might have progressed to full term. She might have shown symptoms of distress earlier. Cases are on record where the dead foetus has been carried for many years in the abdomen. Heskell (13) reports a case of 40 years duration. In the present case it seems most probable that hemorrhage or other dangerous symptoms would have appeared soon.

The following are important points in connection with abdominal pregnancy.

1. The fact that the cause of abdominal pregnancy has not been definitely established.

2. The extreme difficulty in definite diagnosis.

3. From a review of the literature and of my own case (though not wishing to argue from one experience) the rational treatment seems to be to remove foetus and placenta and to stop the hemorrhage. This hemorrhage can be stopped therefore it is bad policy to leave the placenta *in situ*.

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RHABDOMYOMA OF THE PROSTATE

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THE number of reported cases of carcinoma of the prostate gland which have been microscopically examined and well authenticated is very few and the number of rhabdomyomata fewer.

With reference to rhabdomyomata Kaufmann recorded three cases only. It is possible however that some of the spindle cell sarcomata of the prostate may be more properly classified under rhabdomyosarcomata but this can never be proved except by re-examination of the pathological material of the old reported cases—a condition now impossible to meet. It is certain however that rhabdomyomata are most frequently found in

and about the urogenital system as for example in Wollenberger's collection while there are no cases reported as from the prostate yet out of 63 cases of rhabdomyoma 38 involved the urogenital system.

KAUFMANN CASE 1. A child nine months of age had symptoms of bladder trouble with partial retention and pain for six weeks. He died in the hospital without operation. At post mortem an oval tumor was found occupying the region of the prostate. It measured 5x5x4 cm. The surface was smooth and covered by a fibrous true capsule. Neither the ureter nor the seminal vesicles were involved in the growth but there was a right testicular hydropneumosis and a left testicular pyelonephritis. The wall of the bladder was thick and irregularly

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Fig. Embryonic type of muscle-fibers.



Fig. Muscle fibers from fetus of 10 months, showing low resemblance of the fetal fiber to the irregular fibers in Fig. 1.

The tumor was almost completely extra-canal, the lumen of the rectum being nearly closed by the tumor. There were no metastases either in other organs or in the lymph-nodes of the neighborhood. On section, the tumor was found to be firm, hard and divided into irregular areas by bands of connective tissue. On microscopical examination the tumor gave the impression under low powers, at least of spindle-cell sarcoma but more careful examination of the individual cell-forms under higher powers showed that in many cases the spindle-shaped cells which resembled those of sarcoma were in reality more or less rudimentary muscle

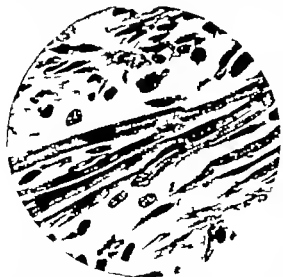


Fig. Longitudinal section of striated fibers more highly developed than those in Fig. 1.

fibers. In some of these fibers rows of striations could be easily made out. The muscle fibers of most parts of the tumor assumed bizarre shapes, the clubbed ends and numerous fibers some of which being almost peripheral others draw out into long tapering strands of ellipsoid form. Some of the longer fibers had rows of small pink granules arranged in a regular space the portion of the cell and the long terminal sprout which give striations. It was, however, many cases difficult to differentiate among the muscle fibers from connective tissue of similar size when the difficulty in differentiating this tumor from sarcoma. Kaufman thinks it probable that this tumor should be classified with the rhabdomyosarcomas because of the large number of cells which could not be definitely determined as muscle fibers though the tumor did not involve the surrounding true rectum and other enteric metastases.

CASE. The patient, a 9-year-old boy, the history of urinary retention was found to have a very large tumor of the bladder which projected into the vesical encephalon and also into the rectum. He died of suppuration of the bladder with bilateral pyelonephritis. At autopsy the growth was found to be the size of a fist. It involved the prostatic region as well as the seminal vesicles and the vasa deferentia. Although of this large size it was still movable through the pelvis. The chief portion of the tumor projected widely over the anterior portion of the bladder and projected into the lumen of this organ in regular lobules from the ureters were also involved especially the right. On cross-section the tumor was soft, smooth, in some places jelly-like and was histologically a sarcoma. Microscopical examination showed in some areas soft myxomatous tissue

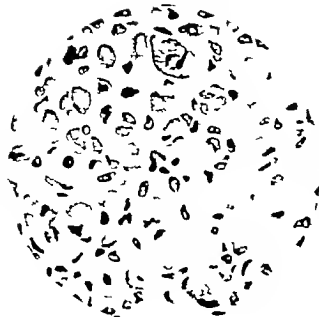


FIG. 4. Field of spindle cells with poorly developed muscle fibers.

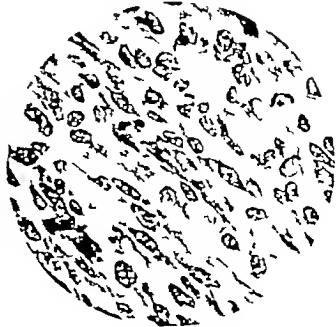


FIG. 5. More mature part of tumor.

ther also normal structures containing numerous spindle cells and a moderate number of fields in which poorly developed muscle fibers with cross-striation could be demonstrated. Because of the large number of spindle cells this tumor must be called a rhabdomyosarcoma although no metastases were found in any of the litterer organs or in the lymph nodes.

The third patient was a 20-year-old man suffering from pain in the perineum and without urinary symptoms. The tumor was evidently malignant. It involved not only the bladder and the prostatic region but also the wall of the pelvis and metastases were found in the left lungs, pleura, the muscular membrane of the stomach, the thyroid gland, the external and internal ureters of the dura. There were numerous metastases scattered throughout the bones. The tumor in the lung and dura were lined. The microscopic examination of the tumor showed a massive cellular mass in which could be found bundles of embryonal muscle fibers showing all the characteristics of striated muscle. The tumor was however much more cellular than those previously described. In the metastases especially in the dura mater the embryonal cellular growth will be found with a characteristic of muscle cells in the primary growth. The presence of numerous metastases, pleural effusion, metastasis in the lungs, the primary tumor and the presence in the lumen of the tumor. The region of the striated muscle tissue in the congenital rhabdomyosarcoma of the perineum due to the group must be laid to an embryonal epithelial metastasis from the epithelium arising from the pharyngeal muscle with the mouth. The epithelial tissue must therefore not be considered as a primary epithelial tumor.

The case which I desire to add to the already reported presented the following history:

The patient a male 40 year of age was examined in September 1915. He was tall, athletic, palely nourished but in excellent general condition. For a period of three months he had suffered from a painful hematuria. The blood would appear with the last portion of the urine voided. With certainty of urination blood was absent but at some time every day it would be present. Increased urinary frequency existed. His health had been excellent and he had had no serious illness at any previous time in his life. Physical examination of the heart, lungs and abdomen was negative.

Local examination of the prostate by rectal palpation revealed a smooth, symmetrically enlarged gland of almost flinty hardness. It felt about as large as a hen egg and no periprostatic infiltration could be appreciated. Cystoscopic examination showed marked trabeculation of the bladder wall. The prostatic urethra was injected and bled from instrumental trauma. There was no intravesical prostatic projection and no residual urine. The urine was negative except for the presence of blood.

The diagnosis was made of early prostatic neoplasia and operation advised. This the patient accepted.

On September 11, 1915, under general anesthesia a radical extirpation of prostatic bladder neck and seminal vesicles was performed.

The prostate was exposed through the perineal incision. After division of the muscularous urethra, close to the apex of the prostate the prostatic neck and neck of the bladder was pulled down and amputation of the esophagus in the pelvic region to the prostate. The seminal vesicles were removed.

en masse with the prostate ligation of their blood supply and vasa being first accomplished.

An anastomosis was then made between the urethra and the neck of the bladder by approximation over an indwelling urethral catheter. Closure of the wound, with gauze dressed down to the urethro-vesical anastomosis, completed the operation.

The specimen removed was about the size of an egg. It had been removed easily and nowhere seemed adherent to surrounding structures. The growth was localized within the lateral lobes and did not seem to involve the urethral port on the gland or to have extended outside of the capsule.

The patient's convalescence from operation was most satisfactory. The indwelling catheter drained the bladder for four days, when it was removed.

The perineal wound healed well; the gauze drains were removed the fifth day. After removal of the indwelling catheter urine was voided through the perineal wound as well as urethra but by the thirteenth day the perineal wound was tight and the patient had no urinary incontinence. He left the hospital on the twenty-second day after operation.

The material removed to operation was submitted for study to the Pathological Department of the Post Graduate Hospital, to Dr. F. E. Wenden and to Dr. F. C. Wood. The diagnosis received from all was rhabdomyosarcoma.

The examination of the gross tissues showed irregular fragments of ragged outline measuring about 7.5 x 5 x 5 cm. A portion of the mass was smoothly encapsulated and the thus encapsulated part were attached remnants of the seminal vesicles. The hardened tumor as reconstructed was flattened oval mass, smooth white and firm on section. In some areas dilated prostatic gland tubules filled with yellowish material could be made out. A few dark colored areas showed hemorrhage at the time.

The microscopic examination showed three different structures.

A very glandular somewhat inflamed prostatic tissue the myeloid bodies were scanty and some of the lveoli contained pus-cells.

Dense fibrous tissue and glandular structures commingled with fibrous tissue, smooth muscle fibers, and large numbers of striated muscle fibers, some very large long and branching others irregular in shape with numerous nuclei some club-shaped fibers also were present. The fibers showed all the peculiar morphological appearances of the striated muscle-fibers seen in rhabdomyosarcoma of the testicle and in the striated muscle of the foetus (Fig. 2 and 3). Cross sections of the fibers showed the usual circular or oval outline with a large nucleus in the spot in the middle of the fiber. Transverse striation of the muscle were so well marked in many places that there could be no question as to the nature of the fibers (Fig. 4). In some areas of this portion of the tumor there was in addition to the glands and the striated muscle fibers a small amount of spindle-cell tissue, looking like newly formed or embryonic cell-tissue but not sufficiently characteristic to permit of the diagnosis of sarcoma.

In the portions of the tumor there was third variety of tissue—pure spindle-cell sarcoma with very little oligogenous material between the cells, the nuclei of which were large rich in chromatin and showed mitoses (Fig. 5).

Thomas W. has here glandular hyperplasia of the prostate with the development of rhabdomyosarcoma.

The subsequent course of the case follows.

He remained in the hospital for some time, received all X-ray treatments were instituted after operation as possible and against recurrence six weeks after operation irradiation could be appreciated by rectal examination. Two months after operation recurrence of the disease appeared in the perineal area and pelvic region but the return became distant and then the disease has rapidly tended to the next stage approaching

EVENTRATION OF THE DIAPHRAGM AND DEXTROCARDIA

WITH A CASE REPORT

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A CASE of diaphragmatic eventration and associated dextrocardia has recently come to my notice. This condition I feel of sufficient rarity to make its publication desirable.

Apparently eventration was first described and named by J. L. Petit when he reported a case in 1790. This term has been in com-

mon use ever since. In 1913 in his paper on

Diaphragmatic Hernia (1) Dr. H. Z. Giffin pointed out the fact that the term eventration would apply equally well or even better to a true diaphragmatic hernia in the commonly accepted sense. By reason of its common acceptance however the term eventration has been continued in this article. In sup-



Fig. 1. Skiaogram, lateral view of patient p on 4. H rt had in right thorax. B left half of diaphragm rising to the level of the third rib.

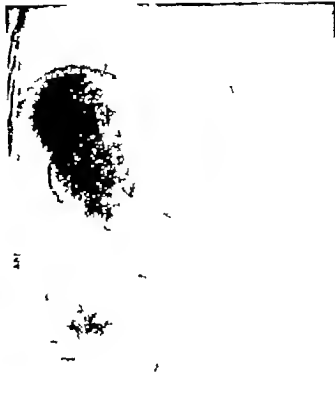


Fig. 2. Skiaogram, posterior view of patient p with buttock elevated and head down. H rt had in right thorax. B left half of diaphragm. In (C) with (D) fat mass (C) which is filled with barium (D) and the gas bubble (E) in the posterior portion.

port of Petit's nomenclature it may be stated that he believed the case he reported to be one form of true diaphragmatic hernia.

In the recent English literature on the subject the most extensive article is one by Sailer and Rhein (2) and to this paper I am indebted for most of the cases mentioned. Since 1900 the *Index Medicus* lists only a short brief of an article by Dr. Hermann Fisher (3) under the title "Relaxation of the Diaphragm." He reported a case.

The history of the case I report is as follows.

Patient is a female, 8 years of age. Family history unimportant. Personal history. At age 8 years the patient fell from second story and struck in sitting posture. No serious result was noted at the time. Three years ago she had typhoid fever. Menstruation normal. She had had several paroxysms of nasal obstruction.

(Check up list: 1) Dyspepsia (2) epigastric pain (3) abdominal bloating and belching (4) palpitation (5) cyanosis.

History. The patient left school in 1924. She has worked in a garage but has never been in the hospital with her condition. Symptoms.

but for at least ten years has been bothered by an upward pressure in chest, especially if she ran or walked up hill. She felt as though her heart was pressed upon and asked after the examination if her heart was not on the right side. She said she always thought it was. She cannot remember whether these symptoms were present before injury or not. She has never been very strong but was always able to indulge in the usual recreations of her friends and the symptoms at present complained of have appeared or have been aggravated within the last year.

She has been very nervous for a year and during this period of time has had much soreness in the epigastrium with abdominal bloating also gas belching which relieves these symptoms. She craves sour food and acids which cause no distress heavy and greasy food aggravates the symptoms (to 3 hours postprandial) and (4) better in very light diet but no food seemed to occasionally help. Nausea and flatulence common. The above symptoms were intermittent until the past month. Also intermittent cyanosis several weeks and palpitation very noticeably only palpitation noticed in very palpable when the cyanotic symptoms are present. These are aggravated by a

heartily meal and also when she lies down. The patient eats very rapidly and is always hungry but does not bulge. Her weight is about normal. There is soreness across lower abdomen when she menstruates. The bowels are regular. She has occasional frequency of micturition (octurnal, 3 times) but never pain. *Phys. Exam. g.* Height 5 feet 4 inches, weight 90.5 pounds (normal). Nutrit. fair. Systolic blood pressure 88, diastolic blood pressure 74, pulse 86, temperature 98.8, hemoglobin, 77 per cent. Urinary findings negative. *Inspection.* Expansion equal, precordial impulse perceptible at the fourth interspace at right margin of sternum. Slight lateral scoliosis. *Pericardium.* Cardia dullness. Left margin of sternum at point 5 in to right of 4. Left supraclavicular and infraclavicular region anteriorly slightly hyperresonant, not tympany over precordial area at level of third interspace. *Respiration.* Breath sounds over left upper lobe higher pitched than on right. Gurgling heard at tympanic area at base of both lungs. Heart sounds normal. Heard most clearly to right of sternum. *Radiography.* *Roentgenogram* showed eventration of diaphragm and dextrocardia (see radiograph).

In all about 500 cases of hernia and eventration have been reported but Fischer was able to find only twenty-three of eventration and Sailer and Rhein in 1903 could collect only twelve definite cases besides their own though there were several discarded because of insufficient data.

We may safely assume that the condition is very much less common than diaphragmatic hernia with which it is most apt to be confused. Fischer defined eventration as a thinning out and fatty degeneration of the muscular fibers of the diaphragm and bulging upward of the same to the level of the second or third rib. Sailer and Rhein define it as an abnormally high position of the left half of the diaphragm with dislocation upward of the abdominal viscera especially of the stomach with hypoplasia of the left lung and dislocation of the heart to the right.

The etiology is uncertain.

1. Some writers consider it as a true hernia.
2. Others believe that it is secondary to hypoplasia of the lung.
3. It is considered also the result of dextrocardia.
4. Some think it is due to a primary congenital defect of the diaphragm.
5. Again, it is regarded as a result of acquired lesions.

Of the 13 cases reported in 1905, 1 was found in a foetus, one in a newborn baby, and 11 in patients ranging in age from 19 to 75 years of age. On these cases there were twelve post mortems and one patient was still living. Two of the cases died of peritonitis, one of pneumonia, 1 of typhoid and 1 of a carcinoma of the tongue. In at least 6 the condition was found accidentally at post mortem. Two cases were reported as dextrocardia. Apparently an abnormal condition of the diaphragm was suspected in only four or five.

The clinical symptoms were very irregular. One patient complained of asthmatic attacks, relieved by eating, one of vomiting and gastric disturbance and one had hematemesis and from the symptoms an incarcerated diaphragmatic hernia was suspected and an operation performed at which time an eventration was found.

I have also seen a case of intestinal fistula of the left thorax, in which the patient had been operated upon under the supposition that an empyema was being dealt with and instead of which there was a true diaphragmatic hernia.

One case is reported in which the symptoms appeared after pneumonia. In one case an adult male after a severe shock there was a sense of something giving way followed by cough, dyspnea and pain in left chest. At post mortem an eventration was found.

Fischer also mentions a case in which the condition seemed to develop following pneumonia and after a time cleared up. Here a diagnosis of paralysis of the left phrenic nerve was made. Sailer and Rhein believe it is the result of a hypoplasia of the left lung together with a hypoplasia of the left half of the diaphragm. The majority of cases are undoubtedly congenital and this hypothesis is true in many cases.

In some however that appear to be congenital in origin there is no hypoplasia of the left lung. In others, again there appears to be a definite association of eventration with an acute infection and in some cases there is found a diffuse fatty infiltration or a fatty degeneration of the muscular fibers of the diaphragm. In one of the cases mentioned and in the one I report, there seems

the aetiological relation to traumatic eventration. Undoubtedly the vast majority of cases are due to congenital defect of the diaphragm or to trauma, but both other conditions must be considered as it appears that acute infectious, traumatic and injury to the left phrenic nerve are occasionally etiologically factors.

The case here reported is of special interest as the clinical findings and the history of previous trauma would lead one to expect that it was dealing with a diaphragmatic hernia. In fact, with out the radiographic findings I did not believe that a diagnosis of eventration could be made. The chief difficulty is always in distinguishing between these two conditions. It is also stated that pneumothorax cavitation of left lower lobe and subdiaphragmatic pyoneumothorax must be differentiated. I did not feel that the latter condition is a much diagnostic difficulty.

A pyneumothorax should present characteristic physical findings and there would be bulging of the intercostal spaces and immobility of the left thorax while in eventration or hernia the respiratory movement appears normal.

It is not conceivable that cavitation of sufficient extent to be mistaken for eventration could exist with out a previous history and sufficient clinical evidence of pulmonary disease to make the diagnosis clear. Both of the above conditions could at once be positively diagnosed also by a radio-copic examination. Subdiaphragmatic pyoneumothorax is also stated to be a condition to be distinguished. I have seen one case as well as several of subdiaphragmatic abscess and in none of them was the possibility of eventration or hernia considered. These generally result from a rupture of diseased gall bladder or the perforation of a gastric or duodenal ulcer. They also are occasionally the result of infection following abdominal operation. The history of the case together with the clinical evidences of sepsis present should be sufficient to exclude eventration or hernia.

The condition that offers serious difficulty in differentiating from eventration is diaphragmatic hernia. These conditions may present identical clinical manifestations and

can be differentiated only by a careful roentgenoscopic examination. In many instances a radiogram or a fluoroscopic examination will satisfactorily differentiate the two, though occasionally a combination of the two methods is necessary. In the present instance the first plate is sufficient to clear the diagnosis. Occasionally however the air bubble in the upper part of the stomach leads to a false line appearing below it which has been mistaken for the diaphragm and because of this a mistaken diagnosis of hernia is made. This mistake can be avoided by filling the stomach with barium sulfate and taking a plate with the patient supine, the bubble elevated to fill the cardiac portion and to force the air bubble to the pyloric end. The same result can be attained by fluoroscopic examination after giving barium and palpating the abdomen so as to thoroughly fill the cardiac portion of the stomach.

Another important diagnostic point is the fact that in hernia there is fixation of the diaphragm and in eventration the respiratory excursion appears normal. This is best determined by the fluoroscope. In the present case there is normal mobility of the diaphragm. A lack of movement would also be found in eventration resulting from a phrenic paralysis and the association of an eventration with a fixed diaphragm would suggest the latter condition.

The extreme importance of differentiating between eventration and diaphragmatic hernia is due to the fact that hernia is a surgical condition and operation is followed by good results, while eventration is not so considered.

In this connection a point of much theoretical interest is: What would be the result of a plication of the diaphragm? Such an operation should be attended by no greater risk than the operation for hernia. The result would be dependent upon the ability of the diaphragm to withstand the increased abdominal pressure. It is possible of course that this would lead to a further stretching of its attachment and a recurrence of the condition. This point could possibly be cleared up by an experimental plication of the

diaphragm in dogs though it is questionable whether an experimental eventration could be produced by section of the phrenic nerve. Unless such an artificial eventration could be produced before plication the experimental proof would not be conclusive.

Many cases of eventration suffer little discomfort, and of course in such the risk of operation is not warranted. If however the condition is attended with sufficient symptoms to interfere seriously with the patient's physical well being I believe that a plication is a procedure to be seriously considered.

In conclusion it may be stated that—

1 Eventration is attended by no definite train of symptoms, and is in fact often symptomless, though it is probable that a careful investigation of a series of cases would show that they were all below par physically as in the case reported.

2 That it results from congenital defects in the left half of the diaphragm or the left lung or of both. That a small percentage of cases are undoubtedly the result of trauma, or follow acute infections, as a result of degeneration of the muscle fibers of the diaphragm or injury to the phrenic nerve.

3 That the physical findings are often identical with those of hernia, and a differential diagnosis can be made satisfactorily only by means of radioscopic examination though

a history of sudden onset of symptoms following injury is very suggestive of diaphragmatic hernia, rather than eventration.

4 That the most important and only uniform physical findings are heart dullness to the right of the sternum tympany on percussion and gurgling heard over the precordial area. These symptoms are the same in hernia and eventration.

5 Rupture with hernia of the diaphragm is undoubtedly much more common than eventration but it is probable that more cases of eventration are being overlooked than in the former condition because of lack of symptoms and also because of the fact that hernia is generally associated with severe trauma and severe physical disability which often ends in death and the condition is found at post mortem. In cases that do not die the resulting disability and history are more apt to direct attention to the condition present than in eventration.

6 The finding of dextrocardia should always call for a careful examination to exclude the possibility of eventration.

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GANGLIONEUROMA

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BECAUSE of its great rarity and the paucity of information in the English literature a brief review of the known facts concerning neuroma seems to be of value. Neuroma is seldom diagnosed before operation. This frequently is due to a lack of knowledge on the part of the surgeon as to the prevalence of this tumor. Perhaps if knowledge in regard to it were more general and slightly greater care were exercised in diagnosis, we would find the tumor to be much more common than is supposed.

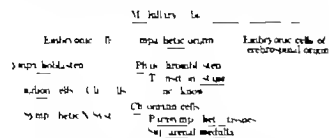
At first, the peculiar white glistening encapsulated tumors found in close relation to the adrenals and the sympathetic nerve-cords were thought to be sarcomata by the American and English observers (Dalton, Pitt, Orr, Parker, Pepper, Amberg, Richards, Hutchinson, Tileston and Wohlbach). They were supposed by some to arise in the suprarenals. Kuster however found that the intercellular substance was fibrillary and did not stain the same as the intercellular substance of sarcoma but did give the same stain.

ing reaction a glia, so because of the peculiar
cigarettes similar to those found in glioma and
the characteristic staining reaction he grouped
the tumors as gliomata.

While most of the author agreed that the tumors were composed of nerve-tissue there was following the publication of Kutter's paper considerable discussion between European pathologists as to the origin of these tumors. Finally J. H. Wright settled the controversy by proving definitely that they were of sympathetic germ-cell origin. Wright called these tumor neuroblastomata. He accounted for their presence in various locations by the accepted teaching that nerve cells not differentiated have a tendency to wander out of the embryonic nervous system and form not only nerves and ganglia but also the components of the sympathetic nervous system.

However it was Lick and Bielschowsky who first prominently emphasized the close relationship between these tumors and sympathetic nerve elements. They named them sympathoblastomata or embryonic sympathetic gangliomata.

According to Poll this relationship of the tumors to the sympathetic may be diagrammatically shown in the following outline



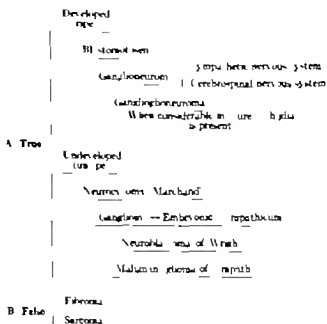
Tumors are known consisting of one or all types (except the phaeochromoblastoma) of the above cells. These tumors in turn are but a subdivision of that great class of tumors called neuromata.

Neuroma which is a general name for the entire class of the tumors under discussion is divided into (1) true and (2) false.

The true neuroma is derived from perineuritic nerve tissue and is the result of hyperplasia of ganglion cells or of the new formation of ganglia. The false is not a neuroma at all but is rather a sarcoma or a fibroma.

According to Pick and Biedschwsky a neuroma consist of nerve-cell originating either from the sympathetic nervous system or the cerebrospinal nerves and ganglia. When the glia tissue is in abundance it is spoken of as a glioneuroma. Under the latter are included (1) pure celled neuroectoma of the cerebro-spinal ganglia (Marchand) (2) ganglioma embryonic sympatheticum (3) large celled form of the area of the Tuberosen Hirn-kerosa (4) neurinome (Verocay)

The relationship of the different classes of nerve-element tumor is shown in the accompanying diagram.



The first ganglioneuroma was described by Loretz in 1890. It occurred in an epileptic 33 years of age and was found on the left side of the second and third thoracic vertebra. It was an egg shaped smooth hard tumor which evidently arose from the sympathetic. On autopsy however no communication with the sympathetic was observed. It is probable that Loretz did not recognize the definite relationship of his tumor to the nerve elements although he described the tumor as consisting of two layers (a) the outer dense of connective tissue (b) the inner soft consisting of numerous ganglion cells partly separate and partly grouped.

In structure the ganglioneuroma is alveolar in type with septa of connective tissue

separating various sized masses of cells poor in protoplasm but containing nuclei rich in chromatin. In some cases these collections have a rosette form and the cells are separated by a fine fibril intercellular substance. This intercellular fibrillary substance as is shown by Pick has its origin in the cells, several of the fibrils having been traced to individual cells. The more the fibrils and the cells become differentiated the closer will be the resemblance to tumors of glia, and then of fully differentiated nerves the neurofibroma.

The following varieties of tumors have been described:

a. The sympathoblasten (Marchand and Hecht)

b. The group containing bundles of fine fibrils separating the cells (Lick Landau)

c. The combination of the fibril masses with ganglion cells and nerve fibers (Martius)

d. The ganglion cells with nerve-fibers.

If the intercellular substance is not markedly fibrillary then the tumor resembles a small round-celled sarcoma and so it frequently happens that the tumor in the neighborhood of the kidney which has little intercellular substance is mistaken for a sarcoma.

In the tumor mass, small cells similar to lymphocytes are seen in conjunction with very large cells. These small cells are (according to the views of Wright Landau Marchand etc.) the immature ganglion cells which later develop into the larger cells.

Vascularity. The tumor as a rule has but slight vascularity so that it may be removed with but slight bleeding.

Location. Ganglioneuromata seem especially frequent in the lumbar region where they originate from the embryonic cells of the suprarenal body. As is known the chromatin substance of this body is of sympathetic origin so that reasoning from analogy we would expect to find tumors of ganglion cells in locations where the ganglion cells are abundant and have a tendency to become highly differentiated and specialized. This we do. They are found originating from the sympathetic ganglia (Landau Pick) also from the sympathetic cords (Shilder Landau) in the coccygeal gland (Alexais Imbert)

According to Friedlrich ganglioneuromata are most numerous in the sympathetic cords and ganglia of the abdominal cavity. Next are the sympathetic ganglia and the medulla of the suprarenals.

They also have been found in the brain (Schminke Pick and Bielschowsky) in the cord (Pick) in the dura mater at the superior orbital fissure (Haenel) in the gasserian ganglion (Marchand and Rissel) in the retrobulbar part of the optic (Perko) in the capsule of the knee (Hagenbach).

Incidence. Ganglioneuroma is more frequent on the left side of the body than on the right 13 out of 16 cases. As a rule it is only a solitary tumor however in some instances metastases have occurred and in one case Henecke found more than 160 tumor nodules. In another case (Miller) metastases were found in the neighboring lymph glands and in another metastases were found in the liver (Jakobsthal).

Ganglioneuroma is more frequent in women than in men (63 per cent) and in the first 20 years of life. The following is a summary of the age in incidence:

t. years	8 cases
to 30 years	6 cases
30 t. 35 years	4 cases
35 t. 40 years	6 cases
40 t. 50 years	1 case
Over 50 years	4 cases
The oldest as 76 years (Weichselbaum) The youngest as 3 months (Busse and F. bra.)	

Symptoms. There are few if any clinical symptoms of ganglioneuroma the tumor being most frequently discovered on autopsy after the patient has died of some other disease. However in many instances the tumor mass has produced symptoms by pressure on the neighboring organs and nerve trunks. In one case (Williamson's) the tumor was located on the sacrum and caused dysmenorrhoea—at the same time the uterus was displaced and ante flexed. In a case of Busse the tumor filled the entire pelvis and reached to the margin of the ribs, so that involuntary passage of feces and urine occurred. Most of the tumor except a small piece under the ribs was removed. In five years there was no return. In the case of Braun the aorta was torn during the



Fig. 1 (left) Cross section of the tumor removed
Fig. 2 Cross section of the mass $\times 5$ magnified
Fig. 3 Cross section of the mass $\times 5$ magnified

Fig. 3 (right) Cross section of the mass $\times 5$
Both reinserted as masses of comparison with Fig.

removal of a large abdominal ganglioneuroma which was supplied by four large arteries from the aorta. The aorta was resected, the two ends united, and uneventful recovery ensued. In a case reported by Peters the tumor had pressed the kidney upward.

In the three cases in which post operative collapse occurred Celner believed that a sympathetic shock with a vessel paralysis had occurred with a consequent bleeding into the abdominal vein.

Especially characteristic of ganglioneuroma are the congenital origin, the occurrence in very early life, and the variation in malignancy. It generally occurs as a single tumor although multiple tumors have been described by Knuss, Kredel, Benek, and Risel.

Prognosis. As a rule there is little tendency to malignancy though Landau believes that the younger the individual the greater is this tendency. The malignancy seems to be reduced in those cases which show a great variety of cellular elements. The greater the tendency to infiltrate and the less the differentiation of the cell the greater is the malignancy. Metastases may occur in neighboring lymph glands or in the liver (Jakobsthal).

Treatment. The only treatment is free and complete removal. If the entire mass cannot be removed without danger to the patient as much as possible should be cut away. Cures sometimes follow such removals.

My case of ganglioneuroma was referred to me by Dr. H. The patient was a well nourished female

infant of 10 months. The chief complaint was a swelling in the left lumbar region which appeared six months previous and followed by erysipelas. The infant was otherwise normal.

The mass was seen to vary in position during respiration becoming more prominent during inspiration and less prominent during expiration. On palpation the mass was felt as a tumor about the size of a small apple could be pushed up under the ribs, and was not tender or elastic. On crying the mass was again pushed down. The vertebrae were apparently normal, no kyphosis or scoliosis and no tenderness. The abdomen apparently was normal.

Diagnostic remarks. From the history and physical findings it was extremely difficult to make a diagnosis. The most probable hypotheses were that the mass was either a lumbar abscess connected with the kidney or a tumor of the kidney itself. In view of the rarity of tumors in the adrenal or of the kidney (with the exception of the cystic degeneration) in children we naturally were inclined to think more of the possibility of an encapsulated abscess. Incision was made into the mass and only a very minute quantity of straw-colored fluid was removed. Examination disclosed some amorphous crystals. This result rendered rather more vague and indefinite the diagnostic conclusions so that the patient was finally referred for operation with the diagnosis of lumbar tumor probably connected with the kidney.

Operation. May 11, 1915. Ether anesthesia. Incision three inches long and parallel to an inch fourths inch from the last rib on the left side. Incision was made through the latissimus dorsi and subjacent fascia. A small nodular mass presented through an opening between the quadratus lumborum and the abdominal muscles. The peritoneal fold was attached to the anterior part of a presenting tumor. The growth was evidently immediately posterior to the peritoneum and its development had pulled the peritoneum down with it. After careful dis-

difficulty because of the dense adhesions, the mass was freed from the adjacent structures. It was touched rather loosely by an apparently fibrous band of tissue beneath the transverse process of the second lumbar vertebra. This adhesion was separated. Ligatures were required as there was but little bleeding. This mass as capsulated and was about two inches in diameter. Neither the kidney nor the spleen were palpable. The wound was closed by catgut approximation sutures, the skin by silkworm gut and gauze drainage was introduced.

On June 19, 1905 the patient was in good condition. On July 1st the drain was removed, there was a slight red thin discharge (retained blood). The wound discharged a thin serous fluid for about one month. At the present time the patient is perfectly healthy and is gaining in weight.

Through the kindness of Dr. Klotz of the Pathological Department of the University of Pittsburgh I am able to furnish the following report on the specimen submitted.

On macroscopical examination the specimen is seen to consist of a lobulated mass of tissue 5.4 x 5 cm. The specimen was flattened the surface being more or less lobulated and apparently covered by capsule. The opposite surface was clean cut by the knife and did not present the natural characteristics. The capsule was quite thin, the cut surface showed glistening grayish-pink structure in which a glassy looking central fibrous tissue existed at the periphery. The tissue showed a fine granular material between the fibrous tissue which further more showed small grayish specks or granules. The tissue did not appear very vascular nor was it friable.

On microscopical examination the sections of the tissue showed very interesting tumor. There was a great deal of fibrillar material which was pink staining and was arranged in tracts or columns. These tracts when closely examined showed many fibrils very closely arranged. In such tract only occasional small mononucleated cells were found. These cells had round nucleus, fair amount of protoplasm, and occasionally fibrils could be seen attached to them. The tracts of fibrils when cut in

cross section consisted of granular looking areas or fine tipping indicating the cross section of individual fibrils. In areas other than these tracts there was also a ground substance of pink staining fibrils, which however were scattered numerous cells of irregular shape and size. In general these cells were unusually large having one or more nuclei and clear homogenous protoplasm. Some of the largest cells contained twelve or more nuclei. Some of these cells were round others pear shaped, while still others were irregular. From the pointed protoplasm of the cell long processes could occasionally be made out. Some of these appeared to continue into fibrils.

Scattered among the cells were also seen homogenous hyaline bodies of circular contour. Here and there calcified masses were found in the stroma. By Mallory's method it was demonstrated that the connective tissue was relatively small in amount while an intricate staining of reddish staining fibrils could be seen in large quantities. The intimate association of large cells of the tumor mass with the numerous fibrils could also be demonstrated. There was no evidence of the presence of myelin sheaths about the fibrils. The diagnosis was ganglioneuroma.

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The patient has recently died of scarlet fever. Autopsy was not performed.

THE APPLICATION OF THE BONE-CRAFT IN THE TREATMENT OF PARTIAL OR COMPLETE AVULSION OF THE ADOLESCENT TIBIAL TUBERCLE (COMMONLY REFERRED TO AS OS GOOD-SCHLATTER'S DISEASE)

A NEW OPERATION

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THE object sought in the treatment of partial or complete avulsion of the adolescent tibial tubercle is the early encouragement to ankylosis of the fractured portion of the tubercle back to the tibia which I have accomplished by pinning the broken fragment of the beak directly to the tibia by a bone-graft pin. The simplicity of application, the great shortening of the usual necessary period of treatment, and the certainty of an early cure of the condition lead me to offer this method as one which has served me most satisfactorily.

This condition is always the result of trauma either by direct injury as in falling on or striking the tibial tubercle or by indirect violence through a sudden powerful contraction of the quadriceps muscle as might occur in the various athletic sports where a sudden and severe strain would be placed on the quadriceps muscle in an effort to maintain the leg in extension when it might be experienced in the all jumping, wrestling, etc. The condition is always found in adolescence but is not associated with the tibial beak and tibia hypertrophy. An injury simulating the laceration of the ligament will not if a direct rupture of the patella ligament which is rare. The fracture of the patella itself is more common. The lesion is sometimes mistaken for a dislocation of the tibia or a tubercular necrosis of the tibia.

The quadriceps muscle one of the most powerful of the body is attached to the tibia about the patella from which it runs a rough tendonous tubercle and passes into the strong band of the patella tendon joining the patella to the tibia in the form of a very strong band of tendonous fiber a portion of which fiber are attached

directly to the tubercle the praved out fibers being attached to the roughened bony ridges of the upper anterior surface of the tibia. Somewhat overlying the direct fibrous attachment of the patella ligament to the tibial tubercle is a bursa in and about whose walls pass some of the direct tendonous fiber of this patella ligament as they pass to their attachment to the tibial tubercle. As a sudden over strain to the quadriceps muscle is felt first by the direct patella ligament fiber these are the ones to become ruptured first or if their bone attachment is not sufficiently osified the portion of the patella ligament at the epiphysis of the tibia is partially or completely separated producing a partial or complete fracture of the tubercle.

Upon the degree and extent of the strain produced by the contraction of the quadriceps muscle depend the amount of the rupture of these fiber and the partial or complete avulsion of that portion of the ununited or partially injured beak of the epiphysis of the tibia. Where the strain has been sufficient only to break the attachment of the central or direct fiber the power of extension of the leg by the action of the quadriceps muscle may still be maintained through the unruptured lateral fasciculi of the patella tendon remaining attached to the tibia about the tubercle and the X-ray will show only a partial separation of the whole tubercle or the breaking out of only a small portion of it. But where the violence has been particularly severe a complete fracture and avulsion of the tubercle back upward take place severing the continuity not only of the attachment of the direct fiber of the patella tendon but also of its lateral strong praved out fiber.

The incomplete separation of the patella



Fig. Photograph of case before operation showing prominence over tibial tubercle break as the result of fracture.

tendon from its attachment is by far the most common and results only in partial disability to the limb. An important factor associated with this condition and one which would seem to be the chief cause of the pain and discomfort experienced in many of these in complete cases of avulsion lies in the traumatism to the bursa overlying the tubercle. This bursa I have found at operation enlarged and tensely distended with bursal fluid. Pressure over this tense bursa before opening always produces pain accompanied at times by a slight increase of local heat as is associated with bursitis. This tenderness lasts longer than would be experienced from the simple rupture of tendon fibers or the separation in continuity of a portion of the tubercle. Then again the local swelling is greater and persists longer than would be looked for in such a trauma. So it would seem from these findings that a low grade inflammation of this bursa is produced kept up by the attempted use of the limb until the fixation of the ruptured fibers is had the contraction of the quadriceps stopped or the ankylosis of the fractured tibial tubercle to the tibia completed.

The consensus of the findings in these cases as to recovery from the injury places the time from six months to two years. If the milder degree of damage has taken place and the diagnosis is made shortly after the injury a few weeks of local treatment suffices

such as fixing the leg in extension with strong compression over the tubercle by crossed adhesive strapping. In the most severe cases where partial or complete fracture of the tubercle has taken place and in cases of late diagnosis symptoms of pain tenderness and partial disability having persisted for several weeks or months, or in spite of local treatment then more radical measures should be resorted to.

There was referred to me the Post-Graduate Hospital case of boy T. C., 4 years of age, who previously had fallen, striking the left knee on a stone. Pain localized tenderness and swelling were the following the injury. No particular attention was given to the injury other than rest of the joint. The condition improved but was not entirely relieved. It was noted that there was a decided localized limp and tenderness on pressure which persisted. He was unable to kneel, the affected knee did not bear a limp in walking and I got up and he experienced pain and tenderness in the knee. He was unable to run with the freedom he had formerly and he stated the left leg seemed decidedly weaker than the right.

My examination in October of 1935 one year after the injury revealed the localized enlargement of the site of the tibial tubercle tenderness pressure weakness and discomfort in attempting voluntary strong extension of the leg slight limp in walking slight increase of local temperature perceptible no joint involvement. The X-ray showed the separation of portion of the beak of the tibial tubercle. As the local symptoms had persisted for so long time and as relief by the conventional methods heretofore adopted promised no speedy cure I decided to apply a new method that of pinning the injured beak of the tibia by means of a tenuous bone pin to stimulate osteogenesis and furnish medium through which earlier bony union of the beak of the tibia could take place and thereby strengthen the tibial tendon attachment which operation I performed in October of 1935.

A curved skin incision about the flexed knee was made and the flap of mediotomy exposing the bursa and tendons of the tibial tubercle. The bursa was found tense and distended and upon incision the bursal fluid escaped as if under pressure. The bursal walls showed increased thickness. Carrying the dissection through the bursa down through the tendinous structures the bone with a 2-inch drill attached to the electric motor hole was made about 3/4 inch deep penetrating through the broken beak into the tibia. Through skin in incision 1 1/2 inches long over the tibia internal to the tibia of the same leg bone trip one inch long was made out with the motor in saw separated 1/4 inch from one another and cut at each end by small motor circular saw to free the bone



Fig. 1. Roentgenogram of leg before operation. Noting tubercle the bent bone substance hanging between the tibia and the femur.



Fig. 2. Roentgenogram of leg after operation. Noting bone graft in position uniting the tubercle to the diaphysis of the tibia.

Operation. This strip of cortical bone was lifted out of the tibial surface by the aid of a thin osteotome and then run through the electric dowel shaper to form a peg $\frac{1}{8}$ inch in diameter to fit the hole previously drilled. The bone peg graft was driven into place and the ends cut off with the small motor saw flush with the bone surface. The skin wound was closed with plain catgut without drain-

age. No fixation dressings to the knee joint were employed. The wound healed by first intention and the patient was up on crutches in two weeks. In three weeks all tenderness on pressure was relieved and the patient was walking in six weeks with all symptoms relieved. The leg has regained its normal strength and usefulness and the patient remains entirely free from all symptoms.

CYLINDROMA OF THE TONGUE

WITH A REPORT OF TWO CASES

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CYLINDROMA characterized by hyaline formations of typical arrangement has been described in the text books as having the following clinical characteristics. It is located about the head especially about the orbit, the salivary glands, nose, antrum of Highmore, and the mucous membranes of the cheek and gums. Its growth is slow, recurrences are frequent, but there are no metastases. Except for some forms described that seem to include a distinctly sarcomatous element, the tumor seems to be relatively benign. Some confusion exists from the fact that some quite different tumor forms have displayed some of the same hyaline characteristics, and also because of the lack of agreement in denoting the term cylindroma and endothelioma.

Several cases that may be described under the title cylindroma have been discussed in the literature. In general the majority of observers have classed the growth as an endothelial form of connective tissue tumor. Some difference of opinion exists even on this point, some men choosing to explain the hyaline structure to be described later as a product of mature connective-tissue element. Others like Lubarsch (1) believe the form originates not from the endothelial but from the perithelial cells of the blood and lymph vessel. The most widely held opinion is however that the tumor is an overgrowth of endothelium lining lymph and blood vessel, and that the hyaline so generally described is either a degeneration product or a secretion product of these cells. This latter point has not been so widely discussed.

In 1911 Dr. Oberlin (2) in a concise and thorough review of the cylindroma question reported three cases from this laboratory, which he described as cylindromata. In that report she considered all the literature to date stating the prevailing theories of origin, development, and classification of the rela-

tively rare form. Two of the three cases which she reports came from the head with a history of 15 to 30 years growth. These she describes as endotheliomata. The third case from the uterus, of rapid growth, exhibits a mixed type with a sarcomatous element. In 1914 Baumgartner (3) in discussing *la pathogenie du cylindrome* takes this view that the cylindroma is a mixed tumor consisting of epithelial and mucoid elements existing side by side and with a predominance of the mucoid material. A further discussion of his views will be considered later in this report.

The especial interest attached to the two cases in hand is the fact that in all cases described in the literature to date none has been mentioned as coming from the tongue. Both tumors were received at the Pathological Laboratory of the University of Michigan within a period of less than two months and present nearly identical features.

Case 1 (4) must be discussed only in the light of its microscopic appearance as no history was obtainable. Case 2 (5) occurred in a woman age 30. Two years previous it began as a thickening on the right dorsum of the tongue. It grew slowly until about three months before removal at which time it became painful and grew more rapidly. No adenopathy occurred with the growth and it was removed entire with its capsule.

In the gross Case 1 appeared somewhat lobbed with a dimension of about eight millimeters in its two smaller diameters and twelve in its greatest dimension. Case 2 was somewhat larger and existed as a single mass. Neither of the tumors was received in fresh enough state to express the hyaline tubes as has been described by some authors. Both tumors gave the hyaline glassy appearance usually described in the section of such growths, the descriptive name cylindroma coming obviously from the appearance of the

hyaline cylinder and ball on section in the gross.

Microscopically the specimens present the following features. Enclosed within a thin but quite definite connective tissue capsule within the muscle of the tongue is to be seen the characteristic arrangement of curved and twisted hyaline strands which in serial section would form the cylinders and knob described in the gross. In some part of the tumor the hyaline patches are seen to include small nests and cords of cells which appear to be of the endothelial type—flat with rounded and ellipsoidal nuclei containing in some apparently the most recently formed cells a rather limited amount of chromatin material. These cells vary quite markedly in size averaging somewhat larger than the endothelial cells lining normal lymph spaces. The same type of cells is noticed in greater abundance arranged in nests and cords extending between the hyaline cylinders. The somewhat radial arrangement of these cells in reference to the hyaline cords is due I believe to contraction of the latter substance. A noteworthy feature is that the hyaline areas are almost exclusively bounded by these cells suggesting the origin of the hyaline. A much less conspicuous element is the mature connective tissue cell which with some small blood and lymph vessels serves to make up the rest of the tumor. Special staining by Kresyl-Echt-Violett gives no staining reaction for amyloid or mucin. Van Gieson stain gives the deep rose red reaction characteristic of connective-tissue hyaline to the non-cellular glassy material and no reaction for mucin is obtainable.

Under higher magnification certain quite distinct markings within the hyaline material suggest the outline of large flat cells from which the nucleus has degenerated. This conception is further substantiated by finding here and there a definite cell inclusion within the hyaline showing the complete cell outline but with the pale vacuolated and contracted pyknotic nucleus at one side. By careful search such cells are seen in all stages of disintegration even to the point where the nucleus has lost its contour and only a remnant of chromatin remains within

a cell boundary. The same cell may have an imperfect wall and may enclose what appears to be a beginning infiltration with the hyaline which I assume to be a secretion of this or other cell about it.

The connective tissue element in both the tumors at hand shows a marked hyaline degeneration but it is quite impossible to trace the relation of this tissue to the hyaline of the cord. The tumor however shows small blood vessels with markedly sclerotic walls while others farther removed from the hyaline cylinders are quite normal in appearance. One of these tumors presents a somewhat different picture *en masse* than the other a difference which I interpret as representing a younger stage of the growth of this peculiar tumor form.

In the first case one is struck by the profuse vascularity of the growth the conspicuous element being the large number of dilated lymph and blood capillaries and spaces. The ramification of the capillaries is easily made out as they stand out sharply often containing a line of red blood cells. The hyaline cords are not in this case so large or so definitely circumscribed as will be described in Case 2. The connective tissue element is much less conspicuous as they are so scattered among the lymph spaces and have not in this younger stage of the tumor undergone the same degree of sclerosis and hyaline change which is so much more evident in the second case as a result of the restriction of blood and lymph supply. One is impressed however by what seems to be a significant fact. In certain areas where the sections show most clearly the curling and branching of capillaries in a single plane one can see between the unbroken endothelium and the connective tissue which makes up the framework of the tumor small areas of the hyaline which from its very relation suggests that it is a secretion product of the endothelium. Where the mixing of this material is more marked one sees that the lumen of the spaces is correspondingly restricted until we have in some field the small cell inclusion referred to above. The peripheral distribution of hyaline I believe to be but a chance one in this field and one equally attractive

by the fact that the hyaline strands are definitely included within a single line of endothelium and contain no cell inclusions the hyaline substance here being quite certainly a secretion within the lumen of the capillaries.

In the second case one is struck by a more characteristic appearance of the hyaline tubes. Here we have the same cellular elements as described above but in somewhat altered proportion and arrangement of these. There are seen definite trabeculae of connective tissue to form a framework including capillaries of large caliber. Both these factors are markedly sclerotic. Within the enclosure of these trabeculae is seen the much twisted and whirl-like arrangement of the hyaline cords. The structure here is not essentially different from that in Case 1 but we notice a relative lack of connective tissue fibers and of capillaries and lymph spaces seen above. But here the hyaline cords are larger and do not show the earlier stages of cell degeneration. The distribution of hyaline too is generally one of secretion within the lumen as evidenced by the external lining which these cords show.

The interpretation to be made then from these observations is this:

1. That the tumors in question arise from abnormal proliferation of blood and lymph capillaries and spaces.

2. That the endothelial lining of these capillaries and spaces gives rise to a secretion of some material which gives the staining reaction of connective tissue hyaline.

3. That this hyaline substance receives a chance distribution centrally or peripherally to the secreting cells.

4. That the excessive proliferation of the vascular elements meeting the resistance of the former connective tissue framework and of the increasing resistance of the hyaline material tends to assume a much twisted curling convoluted structure.

5. That the increasing tension within these convolutions from proliferation and excessive hyaline formation causes first a shutting off of the vascular supply to the tissue and ultimate necrosis of the endothelial cells and tends also to restrict the nutrition of the connective tissue elements with resulting sclerosis and hyaline degeneration.

That the tumors are not of connective tissue origin I think is proved in that they quite clearly are associated with endothelial structures and in all stages show no relation to the connective tissue elements they enclose. Any degeneration of connective-tissue stroma which may be demonstrable in these tumors, I believe to be but secondary to a primary change in the endothelium in contradistinction to the view of Ewetsky (6).

That the hyaline secretion is not perithelial in origin as Lubarsch states I believe to be evidenced by the fact that these hyaline inclusions are seen to be within an endothelial boundary in the greater part of the growth.

Baumgartner following the view of Malassez thinks the cells composing the main part of this form to be epithelial. He further thinks these cells exist in conjunction with a mucoid substance. The preponderance of this latter element he explains as due to the greater vitality of the mucin over the epithelium. He further explains the growth as centrifugal in its course. That the cells are epithelial he attempts to prove by the fact that they do not seem to him to have any connection with the blood vessels. He describes them as being atypical in the center but showing the characteristics of cuboidal and columnar cells at the periphery of his sections. They do not show signs of being secretory so therefore he concludes that the mucoid substance is not a secretion of these cells nor is this substance a degeneration or a vegetative development of these cells. By staining reactions he is satisfied that the material is not myxomatous but true epithelial mucin in nature. In a review of 400 cases described as cylindroma he chooses 83 as true to the type. Seventy four of these are described from the head, three from the sacral region. He explains the presence of mucoid tissue as an embryonic remains similar to the vitreous of the eye and cites the existence of 23 cases from the orbit to substantiate this relation. The description of cylindroma like areas in teratoids lends further weight to his theory of the embryonic origin of this substance. That the epithelial relation of the cells in these tumors is not valid I can only combat with the evidence which I have offered.



Fig. 1. Cylindroma of the tongue (low power) showing the relation of secretory tissue stroma to the basal cell cords and the hyaline tubes. (Note basal keratin.)

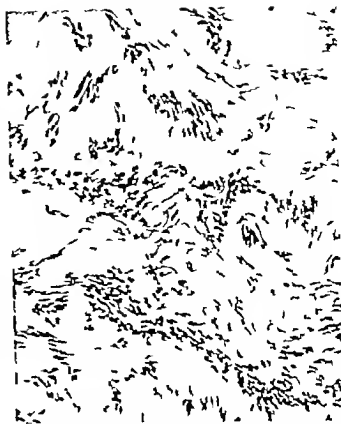


Fig. 2. Cylindroma of the tongue (high power) showing the relation of secretory tissue stroma to the basal cells and hyaline tubes and the intimate relation of the basal cell cords to the endothelium of capillaries and lymph spaces.

Moreover following the analogy of this mucoid substance with the vitreous we must look for a cell matrix which will be the origin of this mucin just as the vitreous takes its origin in the epithelium of the posterior zone of the ciliary body. That the substance is not mucin is certain in these two cases and that it is a secretion of the cells seems a logical conclusion though the secretory power of these cells cannot be proved. The underlying idea of Baumgartner and others that these tumors are possibly embryonic in origin and assume a development during extra uterine life is a conception which seems quite tenable.

That the cylindroma may be described fully as a tumor entity I believe is justifiable because of the fact that several of the cases described under this title have shown no clinical or pathological relation to either carcinomata, sarcomata or enchondromata as believed to be the case by Foerster (7), R. Volkmann (8) and R. Maier (9). A recent report by Richard Weil (10) of a parotid tumor which he has considered as an example of cylindroma gives evidence of the frequent mistaken identity of this tumor form. The

clinical history of his tumor might fall well within the limits of the cylindroma but his brief discussion of its histological nature and his photomicrograph certainly do not conform to the type of tumor I am describing as cylindroma. It is undoubtedly such degenerative forms of epitheliomata that have so complicated the exact classification of the cylindroma. Cylindroma is a descriptive term. But the cell of the cylindroma does not partake in character or arrangement of the features of the basal cell. Dr. Oberlin's Case 3 from the uterus is also an example of a malignant growth with degenerative areas of the nature of cylindroma. Such cases should I believe be called sarcoma cylindromatosum to express this resemblance to cylindroma. True cylindromata show few degenerative changes in some cases mucin being demonstrable. On the contrary they seem relatively benign and evidence microscopically only the arrangement and elements described above.



Fig. 3. Cylindroma of the tongue. The dense connective-tissue capsule above encloses the tumor and separating it from the tongue muscle.

The exact nature and origin of the cylindroma which will lead to its final classification among tumors must remain undecided. I believe, however, that the evidence submitted in my cases combined with that of similar reports points to a logical conclusion. In the belief that the endothelium may take part in the formation of sarcomata, the cylindroma should be considered as a variable form of sarcoma according to Borst (11). True cylindroma is not clinically or microscopically of the character of sarcoma, however. The tissue is not sarcomatous and not infiltrating but is sharply circumscribed by a connective-tissue capsule. If then we consider this form as essentially endotheliomatous, in what does it take its origin? From the cases of true cylindroma described in the literature we are struck by the benignity of the form. The clinical history usually is that of a slow growing nodule lasting over a period of years.

The one history which I submit may seem to indicate an exception to this statement. We cannot be certain, however, that the history of more rapid growth in the last three months is not due in this case to some degree of inflammatory infiltration due to the mechanical irritation of the tumor proper. Considering then the long history, the benignity and the simplicity of the tumor-element—a connective-tissue hyaline in a base of capillaries—it seems logical from pathological experience to consider this of the nature of angioma simplex or perhaps hypertrophicum. In the event cylindroma may be described as of embryological origin of a type of angioma assuming its clinical characters usually some time in adult life. The hyaline may be believed in this case to represent some sort of an attempt on the part of the body at a reparative process in the existing angioma.

Further evidence as to the duration of growth, location, clinical manifestations and microscopical characters in young forms alone can give this tumor its definite place in the classification of tumors. Until then it may quite logically be considered under the title of cylindroma, endothelioma, cylindromatosis or angioma, cylindromatosis.

I desire to express my gratitude to Drs. Warthin and Weller for valuable assistance and advice in making this report.

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DEPARTMENT OF TECHNIQUE

FLUOROSCOPIC ROENTGEN INJECTION OF THE BLADDER

B. L. H. SKINNER, M.D., KANSAS CITY, MISSOURI

ROENTGENOGRAMS of the bladder filled with opaque emulsion of barium have been frequently reported. Such roentgen examinations are of great value in vesical diverticuli, intravesicular tumors, enlarged prostate, etc.

There are certain advantages to these roentgen examinations if the opaque injection is made under fluoroscopic control. It is extremely simple for the patient to lie upon the horizontal roentgen table with the fluoroscopic screen directly over the bladder area as the opaque emulsion is slowly injected into the bladder through a catheter by means of a large plunger syringe or by the gravity method.

The gradual enlargement of the opaque bladder half was witnessed fluoroscopically, the patient being turned from one side to the other in order to note the location of diverticula upon the posterior or anterior bladder wall. The transverse bladder half may be obtained also and is especially valuable in dilatation of the bladder anteriorly and upward or in cases suspicious of a patent urachus.

In the case herewith reported No. 6345, Mr. O'N. referred by Dr. Denlow, the provisional cystoscopic diagnosis was a diverticulum near the position of the left ureteral orifice which could not be entered with the cystoscope for visual exploration.

The patient lay upon the fluoroscopic roentgen table with the knees slightly flexed over a pillow. The catheter was inserted to the bladder and a large syringe filled with barium emulsion was attached to the catheter. The fluoroscopic screen was placed over the bladder area anteriorly and the roentgen tube focused underneath this area.

As the emulsion was gently forced into the bladder by the syringe the opaque shadow grew apace. After 16 ounces of opaque emulsion had been injected no diverticulum having been observed upon the lateral bladder wall, the patient was rotated to the right and left sides and still no diverticular shadow presented itself. Viewing the patient laterally, he noticed the

projection of the bladder anteriorly and lateral to the symphysis pubis with a serrated outline to the bladder wall but no diverticulum was apparent.

When the patient was returned to the original position upon his back, we noticed a large opaque shadow extending upward from the left superior portion of the bladder half in the usual position of the left ureter. This shadow had extended above the pelvic outline toward the left kidney (Fig. 1).

Röntgen negatives were then taken in several positions and this long shadow interpreted as a dilated left ureter. The opening in the bladder wall which was thought to be the mouth of a diverticulum was no doubt the enlarged orifice of the dilated left ureter.



Fig. 1. Showing opaque shadow extending upward from left superior portion of bladder half in the usual position of the left ureter.

This method of fluoroscopic injection of the bladder is valuable in suspected diverticulosis because so frequently the diverticulum is behind the full bladder shadow and the best position for

radiography can be secured with the fluoroscope thus avoiding unnecessary delay or repetition of the bladder injection as when radiography alone is practiced.

AN UNUSUAL HYDROCELE CONTENT

B. D. JOSE EDUQUIL M. D., Philippine I. D.

Assistant Professor of Surgery, University of the Philippines

THE case I am presenting in this paper is not a new one it is however interesting on account of findings met with after the vaginal inc had been opened up. The case history is as follows:

CASE 3548. Perfecto (Mr.) male Filipino age 4 born in Iloilo City came to Philippine General Hospital on April 3, 1935. Complaint right-sided enlargement of scrotum. Habits, smoker 3 cigarettes per day. Family history unimportant. Past history Smallpox and dysentery. Had young occasional fever and cough also al solar bacera and edema of lower extremities fifteen years ago. No venereal disease.

Present illness. Began about fifteen years ago small, soft, fluctuating mass situated at the right side of the scrotum which gradually increased in size until it attained its present volume. This enlargement of the scrotum has never been accompanied the pain

tenderness. The patient never noticed the scrotum to get smaller on lying down, nor to get bigger on standing. Only at times when he is fairly ill developed and emaciated man as he lies in the bed and is able to be up and round, the swelling of importance on examination except the scrotal lesion.

Local examination. Right scrotum is about 15 cm. in size soft and fluctuating. It is oval shape and could be easily moved up and down. (The superficial epididymis prominent and enlarged.) The right testis could not be found. The left testis is apparently normal. On per vaginal touch could be listed above the level of the urethra. The mass seemed to be not entirely filled fluid.

Laboratory studies. Stool, uric acid, urine reaction, and sugar negative. Urinary leukocytes and bacteria few renal epithelial cells, leukocytes and mucus. April 10, 1935.

Operation. April 10, 1935. An incision about 6 cm. long on the anterior surface of the scrotum as made. A mass encountered not touching the stomach. Cum about



Fig. 1 Before operation.

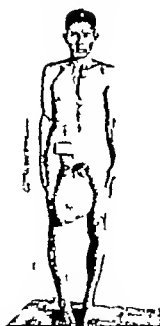


Fig. 2 Before operation.



Fig. 3 After operation.

6 feet of jejunum and duodenum all plastered together. During manipulation one loop of intestine was incised. This a sutured ileum. The appendix was found to be lig and knotted and bound to the posterior surface of the caecum by adhesions. After separating all the adhesions and removing the appendix the entrapped viscera were reduced into the abdominal cavity. The redundant part of the sigmoid was cut off and the remaining trimmed and sutured. A few interrupted sutures were placed behind the testis to hold the edges of the sigmoid sac in position. A loop of the terminal abdominal ring was made to prevent future protrusion of the ileum. Abdominal incision in the scrotal area. The scrotal wall was closed by a separate drainage through a separate count opening.

separate counts opening
titer treatment M 6 015 A r v e cre reaction
The scrotum is just as large a before the operation and
hard Ment of blood and serous fluid mingling
through the drainage scrotum is elevated May
05 Enlargement of the scrotum decreasing Amount
of oozing is less May 15 05 Unimportant
amount of oozing Drainage removed May 05
Scrotum much smaller Serousanguinolent oozing still
present although in small amount and feels much
better May 20 05 Wound healing May 05
Scrotum much smaller every day Patient feels very well
Aid to breast M 05 05 Patient getting stronger
June 10 05 Patient feeling very comfortable June 20
05 Patient complains of sore and pain in the scrotum
A hot compress of aluminum wet with water was applied
to the scrotum and changed very frequently made the
pain less and the fever disappeared.

A h h r n n t h r i g h t f r o n h a s n o t y e t b e e n r e p a i r e d
a n d t h e p a t i e n t d e r m f r o m r e c o n f r o m h a s a i l m e n t
h e w e r e p a r e d f o r t h e s e c o n d t i m e

Jul 9 5 Herniotomy right side after Ferguson
August 6 9 5 Stitches removed W and superficially
infected due possibly to re material. A small sinus
developed and has been drained. Dressed every day.

After the patient has been completely cured of this percutaneous lesion, a photograph was taken (Fig. 3) to compare it with that before the operation (Fig. 1) and:

Phthirus *altiparvulus* 0.5 Specimen 1 that I
an appendix measuring 0.5 mm in length. E. t. small t.
reddish and the whole is soft to touch. The
I red fecal material. Diagnosis: hroni (arrhat
appendix (M. above)

P u o p l e d g e H drocel x th right test
 D rect ompl t e g u n a l h e r n i a A sce p t u s (h r o n
 atarrhal a p p e d a t u s I n t e s t i n a l t h e n F r i
 h u r n a s s

The accompanying pictures (Figs 1 and 2) show the state of the scrotum of the patient soon after he was admitted to the Urological Service of the Philippine General Hospital Surgical Department. As is seen in these pictures the enlargement of the scrotum is so remarkable that it almost touches the inner and upper part of the knee joint. The veins are beautifully distended that they constitute a net work easily seen with the naked eye. The enlarged scrotum is distinctly fluctuating. The right groin is flat although a little bit more elevated than the left. In the inner aspect of the scrotum and upper part of the same just below the gland penis a small bulging is noticed which corresponds to the left testis. The right groin is also fluctuating although the fluctuation is not so distinct as that of the scrotum. Before the operation a diagnosis of hydrocele of the right testis with possible hydrocele of the cord had been made. An operation was advised and agreed upon.

On performing the operation the writer was surprised to encounter condition beyond expectation as are expressed in the post-operative diagnosis.

A BLADDER SUTURE

B. ALEXANDER HAMILTON PEACOCK, M.D. SEATTLE, WASHINGTON

ALL who have attempted surgery upon the bladder have had more or less difficulty in closing the viscus, either watertight or around a drainage tube.

The causes of this difficulty are (1) the distance it lies from the primary incision (skin); the bladder lying quite low in the pelvis especially in men who have a thick abdominal wall; (2) the fact that in all but cases of a hypertrophied and dilated viscus the bladder cannot be brought up to the initial wound as other pelvic organ can be; (3) that the bladder is a contractile organ and apparently shrinks into the size of a golf ball; and (4) that after the bladder has once been incised the incision is apt to develop into an uncontrollable tear due to the insertion of the speculum instruments, or the fingers of the operator and some bladders tear very, very easily. All these things contribute to making a closure of the bladder at times, slow tedious and embarrassing.

Anchor sutures. The most popular suture has been the preincision anchor suture, one on either side of the median line. They have been a great help serving chiefly as tractors and elevators of the edges of the bladder wound. However, they frequently tear themselves loose and are of doubtful aid in the final closure of the

bladder. To overcome these disadvantages the full wing suture has proved most satisfactory, as it is easy to insert, easy to tie and gives a perfectly tight wall.

Modified purse string bladder suture. A perineal fish hook needle is used as pictured in Fig. 1. Chromic catgut size No. 2 twenty-day absorption is the best suture material. After exposing the bladder retractors are inserted and the peritoneum pushed and rolled back off the upper side of the viscus. No matter whether large or small full or empty the dome of the bladder always shows itself. This is grasped at two points in the median line with toothed forceps. Then a purse string suture is started at the fundus down the right side then turned and run up the left side. It will be noticed that the stitch has a crenelated appearance as each new bite into the bladder wall falls into a different line the object being to avoid bringing all the strain and pull on muscle fibers of the same line and group. We aim at the same result with mattress sutures.

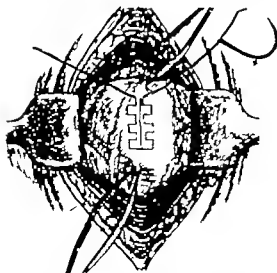


Fig. 1. A. Perineal fish-hook needle. dotted and dashed line crenelated purse-string suture.

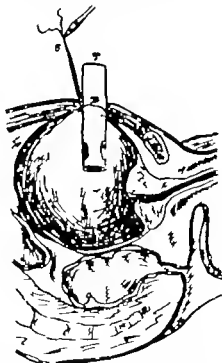


Fig. 2. Suture tied around drainage tube. T drainage tube. B bladder. all drawn tight against drainage tube.

The bladder is now ready to puncture. After completing the intravesical work a drainage tube can be inserted or a retention catheter placed in the urethra and the suture drawn tight. A reinforcing suture can be used, but is quite unnecessary as the natural contraction of the muscles of the bladder wall further assist our purse string. A small cigarette drain can be used in the space of Retzius. This suture has been employed for simple drainage, exploration, calculus retrograde stricture operation, resections for papilloma and prostatectomy, all with uniform success and satisfaction.

I can recommend its use for the following reasons:

- 1 It is easy to insert
- 2 It stays in place and does not tear the bladder
- 3 It lessens bleeding from the large veins in the bladder wall
- 4 It saves much time in closing up the bladder
- 5 It makes a tight closure of the bladder possible insuring a drier wound and better drainage

PITUITRIN IN POST-ABORTION CURETTEMENT

By HENRY DAWSON FURNISS, M.D., F.A.C.S., NEW YORK

FOR the past year it has been my practice to give one cubic centimeter of pituitary extract hypodermatically before curetting for incomplete abortion.

The advantages in doing this are that it produces firm uterine contraction which makes the procedure almost bloodless and much more easily done. Because of this contraction the uterine cavity is small and the contracted walls present a resistance to the curette which makes their cleansing less difficult and, I believe, lessens the risk of uterine perforation.

The most favorable time to give the pituitrin is 15 minutes before the actual curettement is

begun. When the interval between the injection and curettement is less the resulting contraction has not been so pronounced and the result not so good. As yet I have not had any post-operative bleeding following the use of the pituitrin but realizing that such a possibility exists it is advisable to pack the uterus and vagina with iodoform gauze which is removed at the end of 24 hours. Should bleeding occur and be troublesome ergotole can be given hypodermatically.

With the use of pituitrin the blood loss is so much less and the curettement so much easier than without that I strongly advocate its general use.

TRANSACTIONS OF SOCIETIES

CHICAGO SURGICAL SOCIETY

REGULAR MEETING HILD MARCH 3 1906 WITH THE PRESIDENT DR. S. C. PLUMMER
IN THE CHAIR

DR. EDWARD H. OCHSNER read a paper entitled
The Bio-Chemistry of Topical Applications as
Applied to Surgery

DR. F. E. PIERCE read a paper entitled Trauma
of the Back and Spine (See p. 332)

DISCUSSION

DR. DANIEL N. EISENDRATH This is an exceedingly valuable paper to everyone of us especially to those who hold important railroad positions. We are indebted to Dr. Pierce for bringing to us his carefully edited list of cases. I believe that we owe it to these patients, both from the standpoint of a defendant corporation and that of a patient not a claimant for injuries, to be exceedingly thorough in our examination and not regard the patient as malingering. We are very apt to examine them hurriedly and pass them along as cases of sprained muscles, etc.

I have had occasion in the last two years to see a number of cases which were diagnosed as minor injuries, and yet the persistence of the symptoms caused me to make a most thorough examination. I wish to speak in this connection of fractures of the transverse processes of the lumbar vertebrae as being frequently overlooked, because we think that such things could hardly be possible from an injury of the back. A roentgenogram ought to be made of every one of these cases not only in the region complained of but of the entire spine, not only in an anteroposterior direction, but also possible in a lateral direction. Some of the cases of fracture of the ribs near the vertebral column are apt to be overlooked, and again there are cases of fractures of the fifth lumbar vertebra, crushing fractures, without any other symptoms than those of pain. There may be no symptoms on part of the spinal cord, hence it is almost impossible to diagnose them without a good roentgenogram.

Finally I would speak of a superficial method we have of examining some of these cases which of the histries reminded me of and that is injuries of the urinary tract. I had occasion about two years

ago to see a patient who had sustained an injury of the kind Dr. Pierce described, from lifting a heavy weight. The patient was from Grand Rapids, Michigan, and had passed from one practitioner to the other with a history of repeated colics. The colics were referred to one side and only by going into the history thoroughly did we find the colic started on one side of the back and radiated down the same as a typical ureteral colic. We made use of a method of diagnosis that I can warmly recommend to you and that is to make a pyelogram and in this case we found a stricture of the ureter an inch and a half below the pelvis of the kidney as the cause of this man's symptoms. Thinking there could be no connection between the injury of the back sustained by flexion or over extension of the back and injury of the ureter, we later proved by a pyelogram at operation that there was hydrocephalus secondary to the injury of the ureter. So I could make an urgent plea for a more thorough examination in these cases, utilizing every method before passing them along as sprains or possible cases of malingering.

DR. FRA. E. PIERCE (closing) I have nothing further of importance to add. I purposely omitted fractures because it is such a large field.

The importance of making a careful examination in these cases as emphasized by Dr. Eisenrath cannot be urged too strongly. I have had a number of cases in which the diagnosis was made of sprain where the X-ray has shown a fracture of the transverse process, or a fracture of an articular process which had caused pressure on the spinal nerves and symptoms which our examination could not bring out except through an examination of the X-ray plate. It is easy enough to make a superficial diagnosis and say it is this or that, but if we are going to do justice to the patient we should be absolutely unprejudiced and give him the benefit of the doubt, if there is a doubt as to the serious nature of his case.

DR. WILLIAM HENRY read a paper entitled
Epyloitis Following Herniotomy (See p. 97)

BOOK REVIEWS

A CRITIQUE OF NEW BOOKS IN SURGERY

BY MAJOR C SEFLIG MD S N L

ONE of the best book reviews I have ever read (written by Walter Lippman) did not even so much as mention any specific book by title. The reviewer suavely granted himself the license to select a volume only to consign it to oblivion by leaving it nameless; then he proceeded to use it as a text from which to preach a sermon on the meaningless mumble jumble of much of our present day politico-sociological literature. And after all why is it not legitimate to do just this very thing? Why not now and then regard a book as the expression of a tendency rather than as a concrete product to be measured and trimmed by the ordinary conventional standards?

At all events this is the spirit that moves me after reading two new volumes by Crie. Both these volumes are louned on the same material that has served as the basis for other books by Crie already reviewed in this department. In these earl er review we ha e expressed rather emphatic dissent both from Crie's philosophy and from his logic. Of course this is after all only a matter of judgment and someone has said wisely regarding judgment. Tis with our judgment as our watches none goes just alike, yet each believes his own. If Dr. Crie himself should take exception to our estimate of his philosophy and logic he surely can not cavil at our unqualified admiration of his tendency mirrored in these two latest and the two or three earlier volumes dealing with anoci association.

But before stating this tendency it would not be amiss to furnish a few descriptive words regarding the two volumes. *The Kinetic Drive* is a short monograph of seventy pages a reprint of the Wesley M. Carpenter lecture published a few months ago in the *Journal of the American Medical Association*. The main thesis is Crile's now well known doctrine that the body is a mass of potential energy and that the potential energy is converted into kinetic energy by various stimuli calling forth adaptive responses. After detailing this so-called kinetic mechanism Crile dilates upon the function of the adrenals and thyroids and then, under separate chapter heads, considers the control of the kinetic drive in kinetic diseases (Graves disease, cardiovascular disease, Bright's disease, and diabetes) and surgical methods of controlling

The Kamae Diet 1 Phosphorus and Control By George W. Cole M.D. Philadelphia and London W. H. Saunders Co. \$5.00
The Alkaline Diet 1 George W. Cole M.D. New York The Macmillan Co.

th Linetti has actually summarized *My
an Adaptive Mechanism* in a summary volume
of three hundred pages. I find the expan-
sion of the lecture that minutes actually in energy
transforming mechanism leaving the la-
th as do other mechanisms. A very little
introduction containing a few large prin-
ciples open to question if followed by a chapter
voted to man's adaptation to environment. Then
follows Part II of the book of 1 to 10. The
mechanisms of Adaptation and finally Part III
Biologic Interpretation of the phenomena of Health
and Disease.

More specific or detailed treatment is not called for since our aim is merely to point out in general what books of this sort are. And I think I may say just this that the man who writes them is thinking briskly along lines somewhat divergent from the current of his main life work. One would like to call them avocative books. They teach us the service of an avocation. Legitimate recreation might be taken to our characterization of such efforts as an avocation but certainly no workaday operating room or urgent library turns out such product. If for the sake of argument we were forced to admit that these two books are distinctly surgical and represent ultimately the opinion of a surgeon on surgical disease, I should say: Then let us have a few more just such volumes. These are days when men have to be forced to think and imagine and Cline furnishes the most impelling stimulus to this end. Finally even if I be constrained to view the books as pure surgery I shall counter with the statement that they represent the artistry of surgery as contrasted with the artistry of the usual book devoted to the more specifically technical subjects of surgery proper.

HERF is a book that speaks for itself and requires no comment from the reviewer regarding the tendency that it manifests. One may be pardoned for entertaining the suspicion that everything everywhere is tending toward war. Thus much I know that within the year I have had to rearrange my shelves several times in order to make room for new war surgery volumes.

It is a book in practically along the same lines
and after the same fashion as the volume by the
Surgeon General, Alfred J. H. R. C. S. in preface by
Sir Alfred E. Webb M.D. Phil. trop. Med. on "New & C.

Frenchman Delorme the English work by Makins the various contributors to the Oxford War Primers, and the treatise by the American La Garde. The difference lies in the fact that this, being the latest volume to appear presents the latest conclusions reached by the English surgeons.

For example the first chapter on The Bacteriology of Wounds in War summarizes very clearly Sir A. E. Wright's studies of wound infections and their treatment and Chapter II on The General Condition of the Wounded summarizes admirably the data of the various collecting and base hospitals. Chapter III on The Treatment of Wounds and Chapter IV on The Treatment of Wounds by Saline Solutions furnish about the only data that may be appropriated advantageously by the civil surgeon in his routine work. The remaining eleven chapters deal with surgery from the regional point of view and although of unusual interest hardly call for detailed comment, save to mention the salient fact that chest wounds are still handled along lines of the strictest conservatism in contrast with wounds of the abdomen which are being treated more and more radically (as regards early operation or exploration) in accordance with the rules that have been followed in civil practice.

There are several contributors to the little volume and they have done their work well. The book is built for the knapsack, and is built admirably for this purpose indeed.

A RECORD of accomplished purposes not easily incorporated in review of this latest product of Mr. Lane or better this joint production of Mr. Lane, Mr. MacCallan, and Mr. James, for the latter two gentlemen contribute chapters on Speech Training and Dental Treatment of Cleft Palate respectively. Judging from the title this book is ostensibly devoted to a consideration of the subjects Cleft Palate and Harelip. As a matter of fact the latter is quite ignored save for a table showing the frequent co-existence of the two conditions, which table in itself sufficiently warrants more than merely casual reference. After a lengthy introduction, Mr. Lane reveals his purpose by emphasizing the twofold point which really represent the sum and substance of the entire book. The first is that cleft palate operations are to be done very early and the second is that his method of operating by fashioning mucoperiosteal flaps is preferable to the simpler one of paring and co-opting the margins of the cleft.

In the light of illuminating experience surgeons very generally incline to accept the latter dictum as correct and concede to Mr. Lane well deserved credit for originating and popularizing so valuable an operation. They may well concur also in the first point to the extent of dividing operation before dentition interferes with the reflection of adequate mucoperiosteal flaps, and before the child acquires permanent speech defects as speech develops. But

it is possible that Mr. Lane presumes a bit in recommending operation upon the day of birth, or as soon thereafter as possible on this basis that the newly born child is always healthy (p. 34). It is well recognized that serious consequences may follow even the much simpler circumcision operation upon even slightly jaundiced babies.

A SHORT span of less than two decades has sufficed to place the problems of internal secretion into the very center of medical interest and to incite countless number of students to devote their energies to this fascinating subject. Virchow's cellular pathology once supreme and all-embracing no longer seems to stand on its former firm foundation and the camp of those who endeavor to establish the old humoral pathology on a new and scientific basis is daily growing larger. That which was once an unconditional defect is, to say the least, premature at the present day will hardly be denied by the majority of medical workers. Yet, the accumulated mass of clinical and experimental evidence is so immense, and only exceeded by the number of more or less plausible theories that it has been extremely desirable to possess a critical summary of our present knowledge of the nature and significance of the glands with internal secretion. Out of this need was born Bledt's monograph work on the experimental physiology and pathology of the ductless glands. This was followed by an equally important treatise by Falt, which first appeared in German in 1913 and now appears in English translation.

Falt has set himself the task to consider the clinical aspects of the diseases of the ductless glands, and his deductions and conclusions are based upon an exhaustive study of the literature and an exceptionally large number of personal observations. The opening chapter is devoted to a general consideration of the normal and pathological physiology of the ductless glands, their reciprocal action, their interrelations to other organs and their influence upon the constitution of the entire organism. There follow nine chapters dealing separately with the diseases of the thyroid gland, cretinism, affections of the parathyroid glands, hypophysis, and epiphysis, lesions of the suprarenal apparatus, the status lymphaticus and hypoplasticus, and finally diseases of the sexual glands. The last named chapter comprises consideration of the interstitial glands and discussion of changes in the generative apparatus. This includes malformations, hypogenitalism (euchooidism), hypergenitalism, chlorosis, and osteomalacia. A short chapter is devoted to pluriglandular diseases, Infantism, dwarfism, rachitic chondrodystrophy and mongolism are united in a chapter on vegetative disturbances that do not depend directly on diseases of the ductless glands. In another chapter the diseases of the insular apparatus of the pancreas and their

The Ductless Glandular Diseases. By Wilhelm Falt, M.D.
Translated by Milton A. Meyers, M.D., ed. Philadelphia:
Blakiston, 1924. 4 C.

Cleft Palate and Harelip. By Sir Arbuthnot Lane, Bart. M.
F.R.C.S. 2d ed. London, Arnold & Son. 4.

relation to diabetes are treated and the final chapter deals with the different forms of obesity and adipositas dolorosa.

A comprehensive list of bibliographic references at the end of the book covering no less than 60 pages will prove of great advantage to anyone who wishes to study special subjects.

As can be seen from this brief survey of the table of contents the field of study is enormously large and Falta has endeavored to bring order into this existing chaos. His guiding principle has been this: that the diseases of the ductless glands altogether are due to quantitative alterations of the respective internal secretions, that is to say either an increase or a diminution of function. Such a classification which leaves qualitative disturbances of secretions or perverted functions of the glands entirely out of consideration is bound to create objections. Falta himself anticipates such opposition but he meets it by contending that the physiological chemistry of the internal secretions is still in its infancy. The author has endeavored to attack the difficult and complicated problem with strict objectivity. But in a field where our actual knowledge is still incomplete in spite of the imposing material collected there is a great temptation for theories for which the convincing experimental and clinical proofs are still lacking.

In medicine everything is in motion more so in this most modern branch of pathology than in other fields. Falta's book is not the last work; it is only a milestone in the development of the study of the internal secretions. The pathology of the hypophysis and the sexual glands, for instance, is only in its initial stage. The question of diabetes is still *sub judice* and the veil has hardly been drawn from the obscurity of the nature of the pluri-glandular diseases.

Yet the value of the book cannot be overestimated. The astounding erudition, industry and ingenuity of the author fill the reader with sincere respect. The work represents a permanent acquisition for medical literature for it will at times be an inspiring and fruitfulting stimulus upon other scholars to study the clinical aspects of the diseases of the ductless glands.

To have translated this work and to have put it within reach of English speaking students was a laborious undertaking of great merit. The publisher too deserves their fair appreciation. The translator has still further increased the value of the book by collecting recent American and English views in an addendum at the end of an already very chapter.

This is the second English edition and it seems more than likely both from the far reaching importance of the subject and the intrinsic merit of the book that a third edition will soon be needed. Under these circumstances the reviewer cannot refrain from expressing a friendly criticism as to the phraseology of the translation. Typographical errors and misspelled names of foreign authors will of course easily be corrected. The English titles sounds awkward. Disease of the Ductless Glands would seem preferable. More important to my mind is the all too faithful rendering of the German text. It seems unnecessary that the fact of its being a translation should be made so painfully obvious through an almost photographic reproduction of the involved German sentences and the *genius linguae* is often led off for instance the German *Krankheitsbild* appears better as a disease picture. Differentiation is surely superior to delimitation. A literal translation of *Lebersteine* should be excretory rather than upper length. A connection between two phenomena may be not clear or obscure but not unclear and it requires a thorough knowledge of the German language to discover that most misunderstandings merely mean gross misinterpretation. However such defects are not invariable and it may yet be in the power of the translator to make Falta's book an English classic.

A CORRECTION

VERE D. Frank Smithies has kindly called attention to the fact that in the review I have recently published in *Carcinoma of the Stomach* the error in stating that he did not mention the postprandial differentiation between pernicious anemia and pernicious anemia. The differentiation is given in Table of differential diagnosis in his *Textbook of Internal Medicine* (pp. 403-45).

BOOKS RECEIVED

Books received are acknowledged in this department and acknowledgment must be regarded as sufficient return for the courtesy of the sender. Selections will be made for review where there is time and as space permits.

CANCER RESEARCH. HARVARD UNIVERSITY. Third Annual Report of the Charles P. Huntington Memorial Hospital Cancer Research, 1934 and 1935.

THE PRINCIPLES OF CLINICAL PEDIATRICS. By Rudolph Krehl. Translated from the German edition by Arthur Friedrich Beilfeld.

PHYSIOLOGY WITH AN INTRODUCTION. By A. W. Hewell. Third Edition. Philadelphia and London: J. B. Lippincott Company, 1934.

THE MEDICAL CLINIC OF CHICAGO. March and May 1934. Philadelphia and London: W. B. Saunders Company, 1934.

INTERNAL ENDOSCOPY. BY LARY. ST. LOUIS. BY CHEV. BY JACKSON. M.D. ST. LOUIS. THE LARYSCOPE COMPANY, 1935.

THE CLINICAL MEDICINE. BY GEORGE M. GOULD. M.D. PHILADELPHIA: I. BLANK-

ton, Son & Co. 96. 3d ed. revised by R. J. E. Scott, M.A. B.C.L. M.D.

DISEASES OF THE SKIN. By Richard L. Sutton, M.D. St. Louis. C. V. Mosby Company. 96.

THE PRACTICAL MEDICINE SERIES. Series 96. Volume II—General Surgery. Edited by John B. Murphy, A.M., M.D., LL.D., F.R.C.S. Eng. (Hon.) F.A.C.S. Chicago. The Year Book Publishers. 96.

DISEASES OF THE DIGESTIVE TRACT AND THEIR TREATMENT. By A. Everett Austin, A.M., M.D. St. Louis. C. V. Mosby Company. 96.

SKIN CANCER. By Henry H. Hazen, A.B., M.D. St. Louis. C. V. Mosby Company. 96.

ASEPTIC SURGICAL TECHNIQUE WITH OFFICIAL REFERENCE TO GYNECOLOGICAL OPERATIONS TOGETHER WITH NOTES ON THE TECHNIQUE EMPLOYED IN CERTAIN SUPPLEMENTARY PROCEDURES. By Hunter Robb, M.D. 5th ed. revised. Philadelphia and London. J. B. Lippincott Company. 96.

SURGICAL AND GYNECOLOGICAL NURSING. By Ed and Marion Parker, M.D., F.A.C.S., and Scott Dudley Breckinridge, M.D., F.A.C.S. Philadelphia and London. J. B. Lippincott Company. 96.

THE SEX COMPLEX. A Study of the Relationships of the Internal Secretions to the Female Characteristics and Functions in Health and Disease. By W. Blais Bell, B.S., M.D. (Lond.). New York. William Wood & Company. 96.

DISEASES OF THE EYE. A Handbook of Ophthalmic Practice for students and practitioners. By George E. de Schweinitz, M.D., LL.D. (Univ. of Pa.) 8th ed. Philadelphia and London. W. B. Saunders Company. 96.

COLLECTED PAPERS OF THE M. CLERIC ROCHETTE, M.D. Edited by Mrs. M. H. Jellish. Volume VII. 95. Philadelphia and London. W. B. Saunders Company. 96.

GYNECOLOGY. By William P. Graves, A.B., M.D., F.A.C.S. Philadelphia and London. W. B. Saunders Company. 96.

EARLY ANATOMY AND DISEASES OF THE UTERUS TOGETHER WITH DISEASES OF THE UTERUS. By

Thomas Stephen Cullen, M.D. Philadelphia and London. W. B. Saunders Company. 96.

THE MEDICAL AND ALLIANCE BOOK OF TREATMENT AND PRACTITIONER'S INDEX. Bristol. John Wright & Sons Ltd. New York. William Wood & Co., 96.

LATERAL CURVATURE OF THE SPINE AND ROUND SHOULDERS. By Robert W. Lovett, M.D. 3d ed. revised and enlarged. Philadelphia. P. Blakiston, Son & Co. 96.

VENEREAL AFFECTIONS. A BRIEF SUMMARY OF THE PRACTICAL VALUE OF VENEREAL DISEASES. For students and practitioners. By Walton Forrest Dutton, M.D. Philadelphia. F. A. Davis Company. 96.

PRACTICAL MASSAGE AND CORRECTIVE EXERCISES. By Hartvig Nissen. Philadelphia. F. A. Davis Company. 96.

A TEXTBOOK OF PRACTICAL GYNECOLOGY. For students and practitioners. B. D. Tod Gillman, M.D. and Earl M. Gillman, M.D. 5th ed., revised. Philadelphia. F. A. Davis Company. 96.

A MANUAL OF SURGICAL ANATOMY. By Lewis Beery, F.R.C.S. and T. B. Johnston, M.B. Ch.B. New York. William Wood and Company. 96.

THE FINGER AS OF THE HAND. A Guide to the Surgical Treatment of Acute and Chronic Suppurative Processes in the Fingers, Hand and Forearm. By Allen B. Kanavel, M.D. 3d ed. thoroughly revised. Philadelphia and New York. Lea & Febiger. 96.

OPERATIVE MIDWIFERY. A Guide to the Difficulties and Complications of Midwifery Practice. By J. M. Munro Kerr, M.D., C.M. 3d ed. New York. William Wood and Company. 96.

OBSTETRICS, NORMAL AND OPERATIVE. By George Peaslee Sherris, B.S., M.D. Philadelphia and London. J. B. Lippincott Company. 96.

CEREBELLAR AFFECTIONS. ITS ETIOLOGY, PATHOLOGY, DIAGNOSIS AND TREATMENT INCLUDING ANATOMY AND PHYSIOLOGY OF THE CEREBELLUM. By Isidore Flesher, M.D., and Alfred Braun, M.D., F.A.C.S. New York. Paul B. Hoeber. 96.

Clinical Congress of Surgeons of North America

SEVENTH ANNUAL SESSION

PHILADELPHIA

OCTOBER 23 TO 28 1916

CLINICAL CONGRESS OF SURGEONS OF NORTH AMERICA

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ALEXANDER A. UHLE

THE CLINICAL CONGRESS OF SURGEONS IN PHILADELPHIA

It is quite apparent at this time that the limit of attendance for the Philadelphia meeting will be reached some weeks in advance of the date of the meeting so that those surgeons who wish to attend the meeting but who have not sent in their registrations are urged to make application immediately to the Secretary General Dr. Franklin H. Martin, 30 N. Michigan Ave., Chicago, Illinois. When the required number of registrations has been received no further applications can be accepted.

A careful survey of the operating amphitheatre, lecture rooms and laboratories of the several medical schools and hospitals in Philadelphia as to their capacity for accommodating visiting surgeons has been made and the limit of attendance based upon this survey. The popularity of these clinical meetings has become so great that the plan of limiting the attendance and requiring advance registration was decided upon to prevent overcrowding. This plan assures accommodations at the clinics for all who hold membership cards and has worked satis-

factorily at the two previous meetings in London in 1914 and in Boston in 1911.

MEMBERSHIP—REGISTRATION FEE

The Constitution of the Congress provides that all subscribers to the official journal *SURGERY, GYNECOLOGY AND OBSTETRICS* are members of the Congress and that such other legally qualified practitioners as are in good standing in their own communities may become members upon registering at an annual meeting. A registration fee is required of each member attending an annual meeting there being no annual dues for members of the Congress. The registration fees provide funds to meet the expense of preparing for and conducting the annual meetings so that no financial burden is imposed upon members of the profession in the city entertaining the Congress.

THE CLINICAL PROGRAM

The schedule of clinics and demonstrations to be given by the clinicians of Philadelphia during the week of October 3d as published in these

pages is a tentative one and is to be amplified and corrected so that the final program will properly represent the clinical work of the Philadelphia surgeons. The Committee on Arrangements has planned for a complete showing of Philadelphia's clinical facilities in every department of surgery including gynecology obstetrics genito-urinary surgery orthopedics, surgery of the eye ear nose, and throat together with many demonstrations on borderline subjects.

HEADQUARTERS

Headquarters will be established at the Bellevue-Stratford where the Ball Room Clover Room Red Room, Green Room and adjacent foyers and smaller rooms have been reserved for the use of the Congress. These rooms are located on the second floor of the hotel and provide ample space for registration rooms and ticket bureau bulletin boards, etc. the Ball Room being used for the evening meetings.

Headquarters will be open on the afternoon of Saturday October 21st and on Sunday the 22d, for the registration of members. The program

of clinics and demonstrations for Monday will be bulletined on Saturday afternoon and on each afternoon beginning on Monday the complete program for the next day's clinics will be posted on bulletin boards in headquarters. A printed program will be issued each morning and special tickets for all clinics and demonstrations will be issued to members at 8 a.m. each day.

SPECIAL TICKETS

The use of special tickets at previous sessions has fully demonstrated the efficacy of this method of providing for the distribution of members among the various clinics. To prevent over crowding tickets for any clinic or demonstration are limited in number to the actual capacity of the room in which the clinic or demonstration is to be given. These special tickets will be issued at 8 o'clock each morning for the clinics and demonstrations to be held that day a complete clinical schedule having been posted on the bulletin board on the afternoon of the preceding day and a printed schedule of the clinics distributed early each morning.

PRELIMINARY CLINICAL PROGRAM

GENERAL SURGERY

Monday

CHALES H. FRANKER — University Hospital — 9 to 2.
T. TURNER THOMAS — University Hospital — 3 to 4.
GEORGE G. ROSS — German Hospital — 9.
A. D. WHITING — German Hospital — 10.
JOHN B. DEAYER — German Hospital — 11.
E. G. ALEXANDER — Episcopal Hospital — 12 to 1.
HARRY C. DEAYER — Episcopal Hospital — 1 to 3.
W. W. YEE BARCOCK — Samaritan Hospital — 9 to 10.
M. BRENNER — Jewish Hospital — 10 to 5.
KATE W. BALDWIN — Women Hospital — 9.
LEVI J. HANWOOD — Methodist Episcopal Hospital — 10.
W. O. HERMANCK — Polyclinic Hospital — 10.
MORRIS BOOTH MILLER — Polyclinic Hospital — 10 to 11.
LEWIS H. ADLER — Polyclinic Hospital — 10 to 3.
JOHN B. ROBERTS — Polyclinic Hospital — 4 to 5.
FRANCIS T. STEWART — Jefferson Hospital — 4.
MELVIN M. FRANKLIN — St. Joseph Hospital — 1.
W. HERBERT THOMAS — Medico-Chirurgical Hospital — 9 to 11.
JOHN A. BOGER — St. Mary's Hospital — 1.

Tuesday

H. R. OWEN — Philadelphia General Hospital — 10 to 11.
H. R. LOUX — Philadelphia General Hospital — 10 to 4.
J. B. CARRUT — University Hospital — 9 to 10.
A. C. WOOD — University Hospital — 10 to 11.

W. WAYNE BARCOCK — Samaritan Hospital — 9 to 10.
ALFRED HEDENBERG — Mt. Sinai Hospital — 1 to 2.
LEON BRIDGEMAN — Mt. Sinai Hospital — 1 to 3.
A. P. C. ARNOLD — Episcopal Hospital — 9 to 10.
L. H. HUTCHESON — Episcopal Hospital — 10 to 4.
N. TRAMER GREENBERG — Jewish Hospital — 9 to 12.
WILLIAM H. T. ELLER — Jewish Hospital — 10 to 5.
J. M. BALDWIN — Methodist Episcopal Hospital — 10 to 11.
SAMUEL MCCLARRY III — Oncologic Hospital — 1 to 4.
CHARLES H. FRANKER — University Hospital — 9 to 12.
C. P. MOYLE — University Hospital — 10 to 11.
E. G. ALEXANDER — Episcopal Hospital — 10 to 11.
HARRY C. DEAYER — Episcopal Hospital — 10 to 3.
ALFRED HEDENBERG — Mt. Sinai Hospital — 10 to 3.
N. TRAMER GREENBERG — Mt. Sinai Hospital — 10 to 4.
M. M. FRANKLIN — Jewish Hospital — 9 to 12.
WILLIAM H. TELLER — Jewish Hospital — 1 to 5.
W. B. VAN LEE — Hahnemann Hospital — 10 to 11.
JOHN SPEER — Polyclinic Hospital — 9 to 11.
JOHN H. JONES — Polyclinic Hospital — 10 to 11.
JOHN H. GREEN — Jefferson Hospital — 10 to 11.
JAMES A. KELL — St. Joseph Hospital — 10 to 11.
J. F. Y. JONES — St. Joseph Hospital — 1 to 4.
A. C. WOOD — Howard Hospital — 10 to 30.
F. L. ELLISON — Howard Hospital — 10 to 30.
ERNEST LAPLACE — Medico-Chirurgical Hospital — 9 to 12.
JOSEPH H. ROSS — St. Mary's Hospital — 1.

CLINICAL CONGRESS OF SURGEONS OF NORTH AMERICA

Wed a

EDWARD MARSDEN—Univ. of H. tal—t
 E. L. ELLIS—Univ. of H. tal—t
 W. P. HEAR—Phil. & Acad. General Hospital—t
 CHARLES HIRSH—Mt. H. tal—t
 A. P. C. ASHBURST—Episc. H. tal—t
 NATHANIEL GLASSBUR—Jeff. H. tal—t
 M. BERRER—Jeff. H. tal—t
 W. B. VALE—Episc. H. tal—t
 FRANCIS R. C.—W. mar. H. tal—t
 LEVI J. HAMM—D. Methodist Episcopal Hospital—t
 WILLIAM A. TEELE—am. H. tal—t
 JOHN A. B. ER—tels. H. tal—t
 J. B. DEER—tels. H. tal—t
 GEORGE P. M. ELLER—P. H. tal—t
 J. CHAMBERS D.—Jeff. H. tal—t
 CHARLES F. N.—Jeff. H. tal—t
 MELVIN M. FRANK—Jeff. H. tal—t
 ERNEST LAFLOR—Med. H. tal—t

ELLIP P. KILB—t. M. H. tal—t

T

T. TURNER THOMAS—Paula. General Hospital—t
 W. W. NEB—am. H. tal—t
 JOHN B. D.—German H. tal—t
 A. D. WHITE—German H. tal—t
 GEORGE E. ROSS—German H. tal—t
 J. M. B. LOWN—Methodist Episcopal Hospital—t
 JOHN TELLEMAN—P. H. tal—t
 JOHN B. R. BER—P. H. tal—t
 A. C. W.—H. tal—t
 FRA. T. T. T.—Jeff. H. tal—t
 JAMES A. KELLY—St. Joseph H. tal—t
 J. F. J.—St. Joseph H. tal—t
 JAMES A. KELL—t. Mary H. tal—t

F d

JOHN B. DEER—Univ. of H. tal—t
 DAN B. P. ZIEGLER—Univ. of H. tal—t
 LEVI J. HAMM—D. Methodist Episcopal Hospital—t
 A. P. C. ASHBURST—Episc. H. tal—t
 MAX ALLEN—Mt. Sinai Hospital—t
 L. BRINMAN—Mt. Sinai Hospital—t

W. W. NEB—am. H. tal—t
 NATHANIEL GLASSBUR—Jeff. H. tal—t
 WILLIAM H. TELLER—M. B. H. tal—t
 KATE W. BUDWAL—W. mar. H. tal—t
 H. L. N. WITZ—P. H. tal—t
 ERNEST R.—tels. H. tal—t
 AMEL M. CLARE—H. tal—t
 JAMES A. KELLY—P. H. tal—t
 ERNEST P. M. ELLER—P. H. tal—t
 CHARLES F. N.—Jeff. H. tal—t
 ERNEST LAFLOR—Med. H. tal—t
 CHARLES F. N.—Jeff. H. tal—t
 MELVIN M. FRANK—Jeff. H. tal—t
 JOHN A. B. ER—tels. H. tal—t
 HARRY C. DEATER—W. mar. H. tal—t

S

W. W. NEB—am. H. tal—t
 JOHN B. DEER—Univ. of H. tal—t
 LEVI J. HAMM—D. Methodist Episcopal Hospital—t
 THOMAS R. NEIG—Episc. H. tal—t
 JOHN B. R. BERT—P. H. tal—t
 JOHN H. GIBBS—Jeff. H. tal—t
 JOHN J. GILBRIDE—Med. H. tal—t

Ds and H w

LEON B. LEMMA—St. Anne H. tal—t
 HARRY C. DEATER—W. mar. H. tal—t
 GEORGE M. D. B.—t. Mary H. tal—t
 EDWARD B. H. D.—Presb. H. tal—t
 G. P. MULLER—St. Anne H. tal—t
 WILLIAM J. TALL—St. Anne H. tal—t
 H. R. WRIGHT—Presb. H. tal—t
 ROBERT G. LEE—Jeff. H. tal—t
 J. H. H. GIBBS—Jeff. H. tal—t
 FRA. T. T. T.—Jeff. H. tal—t
 CHARLES F. MITCHELL—P. H. tal—t
 EDWARD B. H. D.—Presb. H. tal—t
 FRANCIS O. ALLEN—Penna. H. tal—t
 WALTER ESTELL LEE—P. H. tal—t

GYNCOLOGY AND OBSTETRICS

Monds

THE A. F. C.—German Hospital—t
 BARTON C. KE. HIRST and JOHN COOKE HIRST—How
 and Hospital—t
 E. E. M. TERRY—Jeff. H. tal—t
 C. B. I.—ZIEGLER—Univ. of H. tal—t
 F. C. HARM—am. H. tal—t
 JOHN M. FISHER—t. Anne H. tal—t
 S. M. F. F. C.—t. Anne H. tal—t
 WILLIAM D. COLLIN—West Philadelphia General H. tal—t
 LINDA STEWART COLLIN—W. mar. H. tal—t
 S. M. H. LOCKEY—W. mar. H. tal—t
 J. R. G. CLARK and J. H. CLARK—University Hospital—t
 P. B. BLAND—t. Mary H. tal—t
 F. H. R. MUM—t. Mary H. tal—t

T wds

GEORGE W. OUTENBRIDGE—German Hospital.
 BROOKS M. ANSPACHER—German Hospital.
 D. B. JAMES and N. F. LAKE—Hammann Hospital—t
 EDWARD P. DAVIS—Jefferson Hospital—t
 E. E. M. TERRY—Jefferson Hospital—t
 WILLIAM E. P. KEE—Kenna H. tal—t
 W. P. N. L.—Methodist Episcopal Hospital—t
 RICHARD C. ROSS—Methodist Episcopal Hospital—t
 JOHN H. GRAVIN and GEORGE E. H. EXAKE—Presb.
 terian Hospital—t
 WILLIAM FRAZER—am. H. tal—t
 JOHN A. MCGILVER—t. Anne H. tal—t
 B. COOKE M. A. PACH—t. Mary H. tal—t
 BARTON COOKE HIRST—Univ. of H. tal—t

SARAH H. LOCKERY—West Philadelphia Hospital for Women—to
 ELLA W. GRIM—Woman's Hospital—o.
 MARIE K. FORMAN—Woman's Hospital—to
 LILL B. EVERITT—Woman's Medical College Hospital—
 B. F. BAKER—Polyclinic Hospital—to 4
 P. BROOKS BLAND—St. Joseph's Hospital—to 1 o.
 P. HURST MAIER—St. Joseph's Hospital—to 1

Wednesday

THEO A. ERCK—Gynecological Hospital—to
 BARTON COOKE HIRST and JOHN COOKE HIRST—Howland Hospital—to 1
 E. E. MONTGOMERY—Jefferson Hospital—to
 E. P. D. VIS—Philadelphia General Hospital—to 4
 J. C. APPELGATE—Samaritan Hospital—to
 F. C. HAMMOND—Samaritan Hospital—to 1
 JOHN A. MCGILVER—St. Agnes' Hospital—to
 BROOKER M. ANSPACH—University Hospital—to 2
 C. OLIVER M. PURWELL—Woman's Hospital—to
 P. BROOKS BLAND—St. Joseph's Hospital—to 1
 WILLIAM R. NICHOLSON—Polyclinic Hospital—to 1

Thursday

GEORGE W. OUTERBRIDGE—Gynecological Hospital
 BROOKER M. ANSPACH—Gynecological Hospital
 D. B. JAMES and V. F. LAKE—Habermann Hospital—to
 JOHN M. FISHER—Jefferson Hospital—to 1
 W. R. NICHOLSON—Methodist Episcopal Hospital—to
 RICHARD C. NORMAN—Methodist Episcopal Hospital—to
 C. B. LOWENBERGER—Oncological Hospital—to 3
 J. M. FISHER—Philadelphia General Hospital—to 4
 JOHN H. GIBSON and GEORGE E. SCHOENMAKER—Presbyterian Hospital—to

WILSON KRUMHOLTZ—Samaritan Hospital—to 1
 JOHN A. MCGILVER—St. Agnes' Hospital
 STEPHEN E. TRACY—Stetson Hospital—to 30
 J. H. G. CLARK and staff—University Hospital—to
 WILLIAM D. CULLEN—West Philadelphia General Homeopathic Hospital—to o.
 SARAH H. LOCKERY—West Philadelphia Hospital for Women—to
 MARY T. MILLER—Woman's Hospital—to
 SARAH H. LOCKERY—Woman's Hospital—to
 P. BROOKS BLAND—St. Joseph's Hospital—to 1
 P. HURST MAIER—St. Joseph's Hospital—to
 LILL B. EVERITT—Woman's Medical College Hospital—to

Friday

THEO A. ERCK—Gynecological Hospital—to
 BARTON COOKE HIRST and JOHN COOKE HIRST—Howland Hospital—to
 WILLIAM L. PARKER—Kensington Hospital—to
 F. C. HAMMOND—Samaritan Hospital—to 1
 JOHN A. MCGILVER—St. Vincent's Hospital
 M. LOUISE DIXON—Woman's Hospital—to
 CATHERINE M. O'FARLANE—Woman's Hospital—to

Saturday

P. BROOKS BLAND—Jefferson Hospital—to
 BARTON COOKE HIRST—University Hospital—to
 JOHN G. CLARK and staff—University Hospital—to 1
 WILLIAM KRUMHOLTZ—Samaritan Hospital—to
 WILLIAM R. NICHOLSON—Polyclinic Hospital—to

Days to be announced

GEORGE M. BOYD—Medico-Chirurgical and Philadelphia Lying-in Charity Hospitals.

ORTHOPEDIC SURGERY

Monday

J. T. ROOS and staff—Methodist Episcopal Hospital—to 4
 A. B. GILL—Episcopal Hospital—to 5
 JOSEPH M. SPILLMAN—St. Joseph's Hospital—to 4

Tuesday

M. F. ANKLEY—Philadelphia General Hospital—to
 J. T. ROOS and staff—Methodist Episcopal Hospital—to 4
 H. A. WILSON and staff—Jefferson Hospital—to
 W. J. T. YLOR and staff—Orthopedic Hospital—to 1
 J. P. MARY—Medico-Chirurgical Hospital—to 3
 HARRY HUDSON and staff—Samaritan Hospital—to 4
 G. G. D. VIS and staff—University Hospital—to 3

Wednesday

G. G. D. VIS and staff—University Hospital—to 4
 J. T. ROOS and staff—Methodist Episcopal Hospital—to 4
 A. B. GILL—Episcopal Hospital—to 1
 JOSEPH M. SPILLMAN—St. Joseph's Hospital—to 4

Monday

SIDNEY FELDBERGER—Jewish Hospital—to 3 to 4. Obsolete and interesting fractures.
 A. G. MILLER—German Hospital—to 1

Thursday

H. A. WILSON and staff—Jefferson Hospital—to
 G. G. D. VIS and staff—Orthopedic Hospital—to 10
 J. P. MARY—Medico-Chirurgical Hospital—to 3
 J. K. YOUNG and staff—Polyclinic Hospital—to 5
 C. G. D. VIS and staff—University Hospital—to 3

Friday

J. T. ROOS and staff—Methodist Episcopal Hospital—to 4
 G. G. D. VIS—Widener School—to 4
 G. G. D. VIS and staff—University Hospital—to 3
 J. K. YOUNG—Philadelphia General Hospital—to 4
 J. T. ROOS—Philadelphia General Hospital—to
 DUDLEY J. MASON—Habermann Hospital—to
 J. MARY M. SPILLMAN—St. Joseph's Hospital—to 4

Saturday

A. P. C. AMMUNST and staff—Orthopedic Hospital—to
 H. A. WILSON and staff—Jefferson Hospital—to 1

ROENTGENOLOGY

GEORGE E. FRANKLIN—Medico-Chirurgical Hospital—to 30 to 35. Roentgenotherapy in the treatment of deep-seated malignant disease.
 W. B. NEWCOMB—Presbyterian Hospital—to 3. Bone lesions. Sinus cases (in conjunction with D. Stauffer)

CLINICAL CONGRESS OF SURGEONS OF NORTH AMERICA

Tuesday

- DAVID R. BOWEN — Pennsylvania Hospital — 1 to 2 Fractures.
 FREDERICK C. HUTTON — 438 N. 5th St. — 0 to 12 Organic lesions of the stomach and duodenum.
 W. F. MANOVS — Jefferson Hospital — to 3 Pyelocopy and pyelography.
 W. S. NEWCOMET — Presbyterian Hospital — 2 to 3 Bone lesions. Sinus cases (in conjunction with Dr. Stauffer).
 A. G. MILLER — German Hospital — to 3
 GEORGE E. FRAHLER — Medico-Chirurgical Hospital — 23 to 31 Roentgen diagnosis of gastric and duodenal lesions. Lantern slide demonstration.

Wednesday

- W. F. MANOVS — Jefferson Hospital — to 3 Fluorocopy of the gastro-intestinal tract.
 A. G. MILLER — German Hospital — to 3
 W. S. NEWCOMET — Presbyterian Hospital — to 3 Bone lesions. Sinus cases (in conjunction with Dr. Stauffer).
 GEORGE E. FRAHLER — Medico-Chirurgical Hospital — 30 to 33 Roentgen diagnosis of gall-stones.
 DAVID R. BOWEN — Pennsylvania Hospital — 1 to 3 Bone and joint diseases.
 M. K. FISHER — Stetson Hospital — Joint diseases and radiography of the urinary tract.
 JACOB W. FRANK — Hahnemann Hospital — 9

Thursday

- DAVID R. BOWEN — Pennsylvania Hospital — 1 to 3 Surgical diseases of the thorax.
 SIMPLY FELDSTEIN — Jewish Hospital — 3 to 4 Tuberculous of the lungs.
 FREDERICK C. HUTTON — St. Mary's Hospital — 3 to 5 Intestinal pathology.
 A. G. MILLER — German Hospital — to 3

- W. F. MANOVS — Office — 2 to 3 Brain tumor and intracranial lesion.
 W. S. NEWCOMET — Presbyterian Hospital — 1 to 3 Bone lesions. Sinus cases (in conjunction with Dr. Stauffer).

Friday

- DAVID R. BOWEN — Pennsylvania Hospital — 2 to 3 The management of small and medium-sized hospital roentgen laboratories.
 W. F. MANOVS — Office — 1 to 3 Roentgen examination of teeth as an aid to logical diagnosis.
 W. S. NEWCOMET — Presbyterian Hospital — 2 to 3 Bone lesions. Sinus cases (in conjunction with Dr. Stauffer).
 A. G. MILLER — German Hospital — 1 to 3
 GEORGE E. FRAHLER — Medico-Chirurgical Hospital — 30 to 33 Electro-coagulation in the treatment of malignant disease.
 M. K. FISHER — Stetson Hospital — Joint diseases and radiography of the urinary tract.
 JACOB W. FRANK — Hahnemann Hospital — 9

Saturday

- A. G. MILLER — German Hospital — 1 to 11
 DAVID R. BOWEN — Pennsylvania Hospital — 1 to 3 The management of small and medium-sized hospital roentgen laboratories.
 W. S. NEWCOMET — Presbyterian Hospital — to 3 Bone lesions. Sinus cases (in conjunction with Dr. Stauffer).
 Days to be Announced
 HENRY K. PANCOAST — University Hospital — 9 to 10 Radium therapy 3 to 4. Gastro-intestinal tract.
 W. S. NEWCOMET — Oncologic Hospital — Deep roentgen therapy and radium therapy in advanced cancer cases.

GENITO-URINARY SURGERY

- L. T. A. HICKEY — Hahnemann Hospital — Tuesday 11
 H. M. CHRISTIAN — Medico-Chirurgical Hospital.
 H. R. LOUX and staff — Jefferson Hospital — Thursday 9
 T. R. NEWCOMET — University Hospital.
 L. T. A. HICKEY — Women's Hospital — Tuesday 11

- E. H. SITER — Philadelphia General Hospital.
 E. H. SITER and staff — University Hospital.
 B. A. THOMAS — Polytechnic Hospital — Tuesday and Friday 4 to 6
 A. A. URLE and WILLIAM MACKINLEY — German Hospital — Monday and Friday 4 to 530

LABORATORY DEMONSTRATIONS

- DAVID R. BOWEN — German Hospital — Monday and Friday 4
 V. L. L. — German Hospital — Monday and Friday 4
 DR. S. P. O. F. L. B. T. T. and V. L. L. — Hahnemann Hospital — Wednesday and Friday 9
 I. F. SWIFT — German Hospital — Wednesday 9
 Tumor of the thyroid gland diet
 C. B. L. — Oncologic Hospital — Monday and Thursday 43
 Demonstration of photographic, photo-micrographic and color work with special reference to hospital photography.
 C. J. S. — Oncologic Hospital — Wednesday and Friday 4
 Laboratory technique especially in the development of the Abderhalden reaction.

- P. O. L. LEWIS, R. E. L. L. RICHARDSON and H. S. NEWCOMET — Pennsylvania Hospital — Daily Demonstrations in pathology and bacteriology.
 JERRESON MEDICAL C. L. L. L. — Pathological Museum — Daily 830 to 5
 A. HENRY — Polytechnic Hospital — Thursday 4
 Experiments with small mammals on cancer. Preservation of anatomical material. Methods of injection of eye by metallic wire.
 B. A. THOMAS — Polytechnic Hospital — Thursday 4
 Indication of elimination of indigocarmine as a guide to kidney sufficiency.
 JAY F. SCHAMBER — Polytechnic Hospital — Friday 4
 Laboratory and clinical aspects of salivary gland pathology.

SURGERY OF THE EYE

Monday

WILLIAM CAMPBELL POSEY — Howard Hospital — 2.
 S. LEWIS ZIEGLER — Wills Eye Hospital — 2.
 SAMUEL D. RIEHL — Wills Eye Hospital — 2.
 McCLENNY RADCLIFFE — Wills Eye Hospital —
 WILLIAM M. SWERT — Wills Eye Hospital — 3.
 PAUL PORTTUS — Wills Eye Hospital — 2.
 WILLIAM T. SHORMAKER — German Hospital —
 PAUL PORTTUS — St. Joseph's Hospital — 30.
 FREDERICK KRAUSE — Episcopal Hospital —
 LOUIS LOVE — St. Mary's Hospital — 3.
 AARON BRAV — Jewish Hospital — 5.
 E. D. FUNK — Jefferson Hospital —
 MAR. BUCHANAN — Woman's Medical College Hospital — 2.

Tuesday

WILLIAM T. SHORMAKER — Pennsylvania Hospital —
 GEORGE S. CRAMPTON — Pennsylvania Hospital —
 PHILIP H. MOORE — Methodist Episcopal Hospital — 4.
 WILLIAM W. SPEAKMAN — Hahnemann Hospital —
 WILLIAM CAMPBELL POSEY — Wills Eye Hospital — 2.
 P. N. K. SCHWENK — Wills Eye Hospital — 30.
 WILLIAM ZENTMAYER — Wills Eye Hospital —
 MAR. BUCHANAN — Woman's Hospital —
 G. ORAM KING — Episcopal Hospital —
 WENDELL REIMER — Samaritan Hospital — 4 to 5.
 AARON BRAV — Lebanon Hospital — 2.
 H. F. HANVELL — Philadelphia General Hospital — to 3.
 McCLENNY RADCLIFFE and J. M. GRISCOM — Presbyterian Hospital — 2.
 C. P. FRANKLIN — Stetson Hospital —
 G. E. DE SCHWEDTZE and J. T. CARPENTER — University Hospital — 3.
 O. E. DE SCHWEDTZE — University Hospital — 5.

Wednesday

WILLIAM T. SHORMAKER — German Hospital —
 CHARLES W. LEFEVER and S. J. GISTELSON — Mt. Sinai Hospital — 3.
 L. WEMMER FOX — Medico-Chirurgical Hospital — 1.
 S. LEWIS ZIEGLER — Wills Eye Hospital — 2.
 SAMUEL D. RIEHL — Wills Eye Hospital —
 McCLENNY RADCLIFFE — Wills Eye Hospital — 3.
 WILLIAM M. SWERT — Wills Eye Hospital —
 PAUL PORTTUS — Wills Eye Hospital — 2.
 WENDELL REIMER — Polyclinic Hospital — 2.
 WILLIAM ZENTMAYER — Polyclinic Hospital — 4.
 WILLIAM T. SHORMAKER — German Hospital — 1.
 CHARLES J. JONES — St. Joseph Hospital — 3.
 WILLIAM M. BUTT — Woman's Hospital —
 H. G. GOLDBERG — Episcopal Hospital —

LOUIS LOVE — St. Mary's Hospital — 4.
 J. C. KNIFE — Jewish Hospital —
 JOHN W. CROOK — Philadelphia General Hospital —
 E. A. SEYMUR — Philadelphia General Hospital — 3.
 T. B. HOLLOW — H. M. L. COON and CARL WILLIAMS — University Hospital — 5.

Thursday

PHILIP H. MOORE — Methodist Episcopal Hospital — 4.
 J. A. KEARNEY — St. Agnes' Hospital — 3.
 J. C. KNIFE — Jefferson Hospital — 3.
 WILLIAM T. SHORMAKER — Pennsylvania Hospital —
 GEORGE S. CRAMPTON — Pennsylvania Hospital — 2.
 WILLIAM CAMPBELL POSEY — Wills Eye Hospital — 2.
 P. N. K. SCHWENK — Wills Eye Hospital — 30.
 C. P. FRANKLIN — Stetson Hospital —
 WILLIAM ZENTMAYER — Wills Eye Hospital —
 MAR. BUCHANAN — Woman's Hospital — 2.
 FREDERICK KRAUSE — Episcopal Hospital —
 AARON BRAV — Lebanon Hospital —
 JAMES THORNTON and J. M. GRISCOM — Presbyterian Hospital — 2.
 G. E. DE SCHWEDTZE and E. A. SEYMUR — University Hospital — 3.
 H. F. HANVELL — Philadelphia General Hospital — to 3.

Friday

H. F. HANVELL and WILLIAM M. SWERT — Jefferson Hospital — 45.
 S. LEWIS ZIEGLER — Wills Eye Hospital —
 SAMUEL D. RIEHL — Wills Eye Hospital —
 McCLENNY RADCLIFFE — Wills Eye Hospital —
 PAUL PORTTUS — Wills Eye Hospital —
 E. A. SEYMUR and H. M. LAMMON — Children's Hospital —
 WENDELL REIMER — Polyclinic Hospital —
 WILLIAM T. SHORMAKER — German Hospital —
 CHARLES J. JONES — St. Joseph Hospital — 3.
 G. ORAM KING — Episcopal Hospital —
 LOUIS LOVE — St. Mary's Hospital — 4.
 AARON BRAV — Jewish Hospital — 3.

Saturday

WILLIAM T. SHORMAKER — Pennsylvania Hospital — 2.
 GEORGE S. CRAMPTON — Pennsylvania Hospital —
 P. N. K. SCHWENK — Wills Eye Hospital — 30.
 WILLIAM ZENTMAYER — Wills Eye Hospital —
 H. G. GOLDBERG — Episcopal Hospital — 2.
 AARON BRAV — Lebanon Hospital —
 WILLIAM CAMPBELL POSEY — Wills Eye Hospital —
 WILLIAM ZENTMAYER — Polyclinic Hospital — 3 to 4.

SURGERY OF THE EAR NOSE AND THROAT

Monday

CHARLES P. GRAYSON — University Hospital —
 R. SKILLMAN — Medico-Chirurgical Hospital —
 L. JONES — Philadelphia General Hospital —
 MARGARET BUTLER — Woman's Hospital —
 CURTIS EYER — Episcopal Hospital —
 CARLE LEE FELT — Stetson Hospital —
 RALPH BUTLER — Polyclinic Hospital — 3 to 5.

Tuesday

F. R. PACKARD — Pennsylvania Hospital — 2.
 D. B. KYLL — Jefferson Hospital —
 RALPH BUTLER and JAMES A. BARNETT — German Hospital — 30.
 I. G. SHALLHOUGH and H. S. WEAYER — Hahnemann Hospital — 30.
 R. SKILLMAN — Medico-Chirurgical Hospital —

CLINICAL CONGRESS OF SURGEONS OF NORTH AMERICA

FRED W. SMITH and OSCAR SEELEY — Hahnemann Hospital — 30
 CHARLES C. BIEDERT — Episcopal Hospital —
 LAURA E. HUNT — Woman's Hospital — 2
 WALTER F. BERT — Methodist Episcopal Hospital — 3
 HUDSON M. F. — Philadelphia Hospital —
 LAURENCE J. B. R. and WILLIAM P. C. RAY — St. Mary's Hospital — 1

Bed side

WALTER ROBERTS — Philadelphia Hospital —
 R. SKILLER — Medical-Chirurgical Hospital —
 CARLE LEE FEL — Philadelphia Hospital — 1
 I. G. H. LUCAS and H. S. WEISER — Hahnemann Hospital — 2, 30
 FRED W. SMITH and OSCAR SEELEY — Hahnemann Hospital — 2, 30
 CURTIS EAPS — Episcopal Hospital — 3
 HELEN C. OFF — Philadelphia Hospital —
 D. BRADY K. LE — Jefferson Hospital — 10
 GEORGE M. MARSHALL — St. Joseph Hospital — 10
 MARSHALL BUTLER — Woman's Medical College Hospital —

Thursday

I. G. H. LUCAS and H. S. WEISER — Hahnemann Hospital — 3
 FRED W. SMITH and OSCAR SEELEY — Hahnemann Hospital — 3

CHARLES C. BIEDERT — Episcopal Hospital —
 WALTER R. BERT — Methodist Episcopal Hospital —
 LAURA E. HUNT — Woman's Hospital —
 LAURENCE J. B. R. and WILLIAM P. C. RAY — St. Mary's Hospital — 1
 D. BRADY K. LE — Jefferson Hospital — 10
 A. W. W. T. N. — Philadelphia Hospital —

Friday

SETH M. CLUTE — Jefferson Hospital — 1
 GEORGE M. CLUTE — Jefferson Hospital — 1
 I. G. H. LUCAS and H. S. WEISER — Hahnemann Hospital —
 FRED W. SMITH and OSCAR SEELEY — Hahnemann Hospital —
 GILBERT J. PALL — Philadelphia Hospital —
 CHARLES C. BIEDERT — Episcopal Hospital —
 MARSHALL BUTLER — Woman's Medical College Hospital —
 GEORGE M. MARSHALL — St. Joseph Hospital —

Saturday

GEORGE M. CLUTE — Jefferson Hospital —
 LOUIS J. BURNS and WILLIAM P. C. RAY — St. Mary's Hospital — 1, 5

Dominican

ALEXANDER RANDALL — University Hospital —
 CHARLES P. GRAVE — Medical College Hospital —

PRELIMINARY PROGRAM OF EVENING SESSIONS

CENTRAL SURGICAL DIVISION—In the Ball Room of the Bellevue Stratford at 8 p.m.

Presidential Meeting Monday October

Address of Welcome ROBERT G. LECONTE M.D. Philadelphia, Chairman of Committee on Arrangements
 CHARLES H. MAYO M.D. Rochester Minn. Address of retiring president
 Inauguration of President FRED BATES LUND M.D. Boston and Vice Presidents JAMES HALPENNY M.D. Winnipeg and S. M. D. CLARK M.D. New Orleans
 Presidential address by FRED BATES LUND M.D. Boston The Indications of Cholecystectomy
 J. M. T. FINNEY M.D. Baltimore Drainage of the Gall Bladder
 CHARLES H. MAYO M.D. Rochester Minn. Cholecystostomy vs. Cholecystectomy
 Discussion J. C. D'ACOSTA M.D. and JOHN B. DEWEY, M.D. Philadelphia

Tuesday October 4

DEAN LEWIS M.D. Chicago Fat and Fascia Transplantation.
 Discussion FRANCIS T. STEWART M.D. Philadelphia.
 J. BENTLEY SQUIER M.D. New York City Kidney Surgery
 WILLIAM F. BRAASCH M.D. Rochester Minn. Recent Method in Kidney Diagnosis.
 BRANFORD LEWIS M.D. St. Louis Diagnosis of Ureter Diseases with Their Surgery
 J. T. CERAGHTY M.D. Baltimore Diseases of the Bladder
 EDWIN BEER M.D. New York City The Treatment of Benign Vesical Papillomata Including Endoscopic and Operative Methods
 Discussion EDWARD MARTIN M.D. Philadelphia.

Wednesday October 25

- THOMAS S. CULLEN M.D. Baltimore Methods of Draining Where Pelvic Infections Exist
 Discussion E. E. MONTGOMERY M.D. Philadelphia
- J. WHITRIDGE WILLIAMS M.D. Baltimore The Abuse of Cesarean Section.
 Discussion EDWARD P. DAVIS M.D. Philadelphia.
- GEORGE G. WARD JR. M.D. New York City Treatment of Inaccessible Vesico-vaginal Fistule
 Discussion JOHN G. CLARK, M.D. Philadelphia.
- C. JEFF MILLER, M.D. New Orleans Surgical Treatment of Puerperal Pyemia
 Discussion BARTON C. HIRST M.D. Philadelphia.
- THOMAS J. WATKINS, M.D., Chicago Cystocoele and Prolapse
 Discussion BROOKER M. AMSPACH M.D. Philadelphia.

Thursday October 26

- C. A. PORTER, M.D. Boston Surgery of the Peripheral Nerves
 Discussion CHARLES H. FRAZIER, M.D. Philadelphia, and JOHN H. GIBSON M.D. Philadelphia.
- WILLY MEYER, M.D. New York City Cancer of the Breast
- WILLIAM J. MAYO, M.D. Rochester Minn. Cancer of the Stomach
 Discussion FREDERICK W. PARHAM, M.D. New Orleans.
- GEORGE E. ARMSTRONG, M.D. Montreal, Canada Cancer of the Large Bowel
 Discussion STUART McGUIRE M.D. Richmond and E. WYLLYS ANDREWS M.D. Chicago
- HOWARD A. KELLY M.D. Baltimore Treatment of Cancer by Radium.
- JAMES T. CASE, M.D. Battle Creek, Mich. Treatment of Cancer by X ray
 Discussion GEORGE E. PFANTER, M.D. Philadelphia.

DIVISION OF SURGICAL SPECIALTIES—At the Bellevue Stratford at 8 p.m.

Friday October 27

Symposium on Ophthalmic Surgery

- ARNOLD KNAPP M.D. New York City The Present Status of Extraction of Cataract in the Capsule.
- WALTER R. PARKER, M.D. Detroit Corneoscleral Trephining Usually Known as the Elliot Operation.

Wednesday October 25

Symposium on Rhinological and Laryngological Surgery

- CHEVALIER JACKSON M.D. Pittsburgh Some New Developments in Bronchoscopy
- R. CLYDE LYNCH, M.D. New Orleans The Technique of Suspension in Bronchoscopy and (Esophagoscscopy
- HARRIS P. MOSHER, M.D. Boston The Webs and Pouches of the Upper End of the Esophagus
- Discussion D. BRADEN KYLE M.D. GEORGE M. COATES, M.D. CURTIS C. EVES, M.D. Philadelphia

PUBLIC MEETING Friday October 27 in Witherspoon Hall, at 8 p.m.

Under combined auspices of the Philadelphia County Medical Society the Department of Public Health and Charities, and the Clinical Congress of Surgeons of North America.

- WESTON A. PRICE, M.D. Cleveland Care of the Teeth. (Illustrated by lantern and cinematograph.)
- JOSEPH C. BLOODGOOD, M.D. Baltimore Diagnosis of Cancer
- ROBERT W. LOVETT M.D. Boston Description and Illustration of Curable Deformities and the Importance of Their Proper Treatment.

SEPTEMBER 1916

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The Editorial Board of the INTERNATIONAL ABSTRACT OF SURGERY has desired for some time to present a comprehensive review of the work done on surgery of the eye. In this branch of scientific endeavor there is work being accomplished which is of the utmost value to the patient which has reached the height of technical proficiency and which is virtually unknown except throughout the relatively small group of men devoting their efforts to this so-called minor specialty.

Perhaps at this time no subject is of greater interest to the ophthalmic surgeon than that of glaucoma, the literature concerning which has become at once extensive and valuable. In this maze of competition the interested reader finds a wide divergence of opinion. Partly to clarify this confusing situation and in part to give ophthalmic surgeons a broader scope in our columns we have secured a collective review on the surgery of glaucoma from the pen of Dr Emory Hill of Chicago. While a discussion of this subject at the present time may lack finality Dr Hill's experience as a student and surgeon has enabled him to present the matter broadly and with such decision as may safely be arrived at today.

Other collective reviews to be published during the next few months are

Mechanism of Fractures	EMMET RICHFORD, M.D. San Francisco
Tuberculosis of the Genito-Urinary Tract	J. H. CUNNINGHAM, JR., M.D. Boston
A Comparison of the Results in the Conservative and Surgical Management of Eclampsia	REUBEN PETERSON, M.D. Ann Arbor, Mich.
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INTERNATIONAL ABSTRACT OF SURGERY

SEPTEMBER 1916

COLLECTIVE REVIEW

CONGENITAL MALFORMATIONS OF THE NECK

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A Consulting Surgeon, Cook County and Rushmore Hospitals

HISTORIC

ACCORDING to A. Funk (8) to Ascheron in 1832 must be given the credit of first discovering that congenital cysts and sinuses of the neck had a definite connection with aberrations of fetal branchial clefts. Somewhat later Roser and Koenig reinvestigated the same subject and confirmed Ascheron's findings. Lillenthal (11) and DaCosta (22) credit Mayer in 1833 with the first comprehensive report on carotid body tumors although Luschka in 1862 so popularized the subject that this body is now very generally known as Luschka's gland. After a most careful perusal of the literature the reviewer has failed to find the original authors who first classified cystic hygromas, lymphatic cysts, hemorrhagic cysts or teratomata of the neck among tumors of congenital origin. Exact knowledge of these malformations appears to have been acquired through a slow process of medical evolution. Giacomo (32) believes that Wegner should be given credit for describing cystic hygromata of the neck in 1877.

FREQUENCY

Burke (1) makes the statement that thyroglossal cysts occur with comparative frequency. Dowd (51) in looking over the records of the New York Surgical Society found no report of a complete branchiogenic fistula thus indicating its comparative rarity. The records of the Cook County Hospital of Chicago from 1909 to 1916 reveal 5 cases classified under the heading of congenital malformations of the neck. A

careful analysis of these 5 cases compelled the reviewer to reject 6 of them; the clinical history, operative findings and lack of pathological report all speaking against their embryologic derivation. One case, a doubtful branchial cyst, was a fluctuating circumscribed swelling the size of an almond lying subcutaneously over the center of the right sternomastoid muscle. At operation the tumor was found within the sheath of the muscle but there is no mention of any obliterated duct proximal or distal to the tumor and no pathological report is attached to the case history. The eighth case was an undoubted thyroglossal cyst. McKenty (1) reviewing the records of the Royal Victoria Hospital for ten years (1904 to 1914) was more fortunate being able to tabulate 15 branchiogenic cysts, 5 branchiogenic carcinomata, 9 thyroglossal cysts and 1 carotid body tumor—a total of 30 cases. Collison and McKenty (9) were able to collect 60 cases of carotid body tumors in the literature up to 1913. Of these 60 cases, 4 had merely been accidentally found at autopsy and 2 had been examined post mortem; the nature of the growth not having been recognized ante mortem. Dowd up to 1913 collected reports on 91 cases of cystic hygroma of the neck, and only 35 cases involving the axilla or pectoral regions.

From a careful analysis of cases reported to date it becomes self-evident that in general the diagnosis of congenital malformation was only arrived at after the operation. In the case of congenital cysts only a microscopic examination of the epithelial or endothelial lining of the cyst

wall will reveal the true nature of the tumor. Clinically, a definite diagnosis of congenital fistula can only be made when it is either complete i.e. extending from the pharyngeal wall or foramen cecum to the lateral or anterior surface of the neck or of the incomplete internal or incomplete external types i.e. opening either on the surface of the neck or in some portion of the pharynx. A pre-operative differential diagnosis between a true branchial or thyroglossal cyst (closed at both ends) and a hygroma cysticum colli, would appear to be impossible.

CLASSIFICATION

The classification of embryologic malformation has never been placed on a firm basis. Each author has apparently been content to work out his own scheme, with little or no regard to previous publications. Thus O. C. Smith (6) in his otherwise splendid classification of tumors of the neck, includes aneurysmata, hygromata, and dermoids of the neck under neoplasms and not among embryologic malformations. Murphy (3) classes the above under the proper heading but includes carotid body tumors among malignant diseases of the neck. He also classes hygromata as bursal cysts. Smith classifies carotid body tumors under the heading "tumors of special organs." Branchiogenic cysts are classified by the same author under two heads: (1) congenital (2) malignant, which is needlessly confusing. Kirmisson (14) divides all congenital cysts of the neck into (1) serous (2) dermoid (3) mucoid. His serous cysts are evidently hygromata, for he describes them as large multilobulated extending from the lower jaw to the clavicle and from the median line almost to the spinous processes of the vertebrae. There may be as many as 100 pockets in one tumor. These tumors have a tendency to penetrate muscles (pseudo-malignant); they may even pass under the clavicle and form axillary cysts, or under the manubrium to the anterior mediastinum. He considers the etiology of serous cysts under two headings: (1) venous, because of their frequent intimate connection with the interior jugular vein and the clinical fact that the contents of the cyst is frequently bloody; (2) lymphatic, because of the dilatation of surrounding lymph channels. Dowd (10) writing on the subject of cystic hygromata of the neck, states that three types of growths have been included in some of the descriptions (in medical literature): (1) cystic tumors which have endothelial linings and which grow with much power through the tissues of the neck or downward under the clavicle into the

axilla or pectoral region; (2) lymphangiomas; and (3) branchial cysts. He correctly maintains that only those of the first type should be called hygromata.

The following classification based on embryologic, microscopic, and clinical data, has been compiled from the case reports to date:

1. Branchiogenic
 - (a) Complete fistula (branchial fistula of Roser) patent both ends
 - (b) Incomplete fistula

(Cystic fistula)	{	Internal
		External
 - (c) Branchial cyst closed both ends open in intermediate portion
2. Thyroglossal
 - (a) Complete fistula (extremely rare)
 - (b) Incomplete internal (rare)
 - (c) Incomplete external (rare)
 - (d) Thyroglossal cyst (usual type)
3. Aberrant thyroid gland.
4. Supernumerary thyroid.
5. Lymphangioma (lymphangioma simplex and cavernosum).
6. Hemorrhagic cysts (hemangioma congenitum).
7. Hygroma (hygroma cysticum colli congenitum).
8. Dermoid cysts (in parotid gland near floor of mouth in thyrohyoid or submaxillary region) Kirmisson (14).
 - (a) Primary benign
 - (b) Secondary malignant.
9. Carotid body tumors
 - (a) Primary benign
 - (b) Secondary malignant.

EMBRYOLOGY

Branchiogenic fistula or cyst. In the development of the anterior part of the digestive tract there are formed bilaterally symmetrical lateral diverticula which pressing aside the lateral mesoderm of the head, come into apposition with corresponding invaginations of the ectoderm. The endodermal diverticula are termed pharyngeal pouches, while the ectodermal invaginations are known simply as branchial grooves. By pressing aside the mesoderm the ectoderm and the endoderm for a time come in contact and fuse forming the epithelial closing membrane which breaks through in all forms that have a branchial respiration. The branchial grooves and pharyngeal pouches thus become continuous and together form the branchial clefts. Under normal conditions this fusion and breaking through does not occur in mammals. Between the branchial clefts are the branchial or visceral arches, each of which contains a skeletal rod, the cartilaginous branchial arch, its muscular

ture an aortic arch and a nerve trunk. The branchial arches are named in succession the mandibular hyoid and branchial arches proper. The first branchial cleft is also known as the hyomandibular cleft (Keibel and Mall 57).

In a four week-old human foetus there are four branchial clefts which correspond to the gills in the fish. All these clefts should become completely obliterated or in other words the arches or bars separating the clefts should coalesce (with the exception of the first cleft which forms practically speaking the canals opening into the pharynx) leaving the neck perfectly smooth. The auditory canal develops at the site of the first cleft (52-53). The eustachian tube the middle ear and the external auditory meatus would really form a complete fistula but for the membrana tympani which represents the thinnest portion of the cleft and contains two layers of epithelium one from the ectoderm and one from the endoderm. This near fistula is really very similar to the real fistulae which sometimes exist in the neck at the site of the second cleft. When maldevelopment of the first cleft occurs it is apt to show itself by tabs in front of the ear or defects of the ear itself and occasionally is associated with defective formation of the mouth (Dowd 10). If nature fails in any of these particulars there is produced a congenital fistula a cyst or both (Funk 5).

The region that corresponds to the outer opening of the second branchial cleft is to be found at the anterior border of the sternomastoid muscle. The second pharyngeal pouch corresponds to the tonsillar depression the openings of the third branchial cleft (pharyngobranchialis) are to be looked for near the larynx. A fistula of the second branchial cleft must lie if the development of the vessels be normal between the external and internal carotids and anterior to the glossopharyngeal and vagus nerves a fistula of the third cleft between the common carotid and vagus as well as between the glossopharyngeal and upper laryngeal nerves while a fistula of the fourth cleft must bend around the subclavian artery on the right and the arch of the aorta on the left. In these are derivations of the fourth aortic arch. So far only fistulae of the second branchial cleft have been recognized with perfect certainty.

4. Thyroglossal fistulae or cysts aberrant or supernumerary thyroids. Almost certainly associated with the formation of the first pharyngeal pouch there appears the anlage of the thyroid gland. This anlage is recognizable before the first pharyngeal pouch has become intact



Fig. Incomplete internal branchial cyst fistula (De Tarnowsky collection.)

with the ectoderm as a prominence in the ventral wall of the pharynx. It then becomes constricted to form a stalked vesicle and its stalk whose lumen becomes obliterated persists for some time as an epithelial cord. The hollow stalk of the vesicle is the thyroglossal duct (57).

In a human foetus of five weeks we find this small vesicle on the back of the tongue. By the eighth week the first trace of glandular tissue appears. This is the developing thyroid gland which begins to secrete as early as the fourth foetal month. The gland slowly passes down to its normal resting place through the thyroglossal duct and this passage is obliterated behind it. Normally nothing remains of this duct except the foramen caecum but when nature fails to do her duty a congenital abnormality is developed. If some of the thyroid cells are dislodged from the gland and remain along the duct these may develop into accessory thyroid. The thyroglossal duct may fail to be obliterated either partially



Fig. 2. Multiple lipomata. (John
Surgical Diagnosis, Vol.)



Fig. 3. Branchiogenic cyst. New
York Hospital. (Dr. Hartley)



Fig. 4. Mixed venous and lymphatic
phleboma. (Johnson, Surgical
Diagnosis, Vol.)

or totally, causing the existence of a fistula or cyst (8).

5 Lymphatic cysts (lymphangioma-cysticum). The first evidence of the formation of the lymphatic system is the development of symmetrical sacs in the neck, which have been called jugular sacs. These are first found in the human embryo as endothelial lined sacs just lateral to the internal jugular veins. These jugular sacs become bridged or cut into by bands of connective tissue, this being the process by which each sac, originating from a plexus of blood capillaries, is reconverted into a capillary plexus lymphatic in character. Out of these lymphatic capillaries chains of lymph-glands are evolved. The jugular sacs and thoracic duct may be termed a primary system; the secondary or peripheral lymphatics grow out from the primary system (Sabini 58). Many of the lymphangiomas are found in connection with the sutures and fissures of the body. Thus we recognize macroglossia (tongue), macrocheilia (gums, lips), nevus lymphaticus (skin), etc.

6 Hemorrhagic cysts. Since the human embryo like that of all other vertebrates, possesses a row of definite gill bars or visceral arches, separated distinctly externally by clefts, internally by endodermal pockets or pouches, so also its primitive vascular system is in conformity with this fundamental plan, and strong branches, connecting the dorsal and ventral aortae—the aortic arches—each course in a visceral arch. Six of these aortic arches are recognizable in a human embryo 5 mm. long. Our present knowledge of the vascular system in the human embryo points to the fact that normally the first two

aortic arches are lost, as far as their actual arch portions are concerned, but the third and left fourth arches are retained becoming the root portion of the internal carotid and aortic arch respectively. Certain portions of the remaining arches are retained forming parts of the carotids, the pulmonary arteries, etc., the remainder of the arches normally disappear (57). Faulty retrogressive changes in a certain portion of one of these aortic arches account for the presence of congenital hemangiomas. Their situation always corresponds to embryonic lines of fusion such as the facial or branchial clefts (59).

7 Hygroma. Embryologically speaking a hygroma is probably the result of fetal sequestration of lymphoid rests (10). It has also been suggested that its origin may be from the inter-carotid ganglion. Kirmisson (14) thinks its origin may be either venous or lymphatic. On account of their pseudomalignant independent power of growth it has seemed best to consider hygromas as differing from lymphangiomas.

8 Dermoid cysts. Embryologically both sequestration and tubulodermoids may occur in the neck. In the first instance, a portion of surface epithelium becomes pinched off and continues to develop beneath the skin surface. In the latter case a portion of embryonic canal (branchial cleft, thyroglossal duct) remains patent and a mixed dermoid results (60). Batut (23) restricts the use of the term dermoid to tumors of the neck containing ectodermic inclusions, classifying as mucoides those representing endodermic inclusion. Kirmisson (14) also states that dermoids of the neck represent a retention of epidermal cells whereas mucoid

cysts are lined with cylindrical epithelium often possessing vibrissae.

9 Carotid body tumors. There is little uniformity of opinion regarding the embryologic derivation of this body 5 mm. long 3 mm. wide and 2 to 5 mm. thick. Collison (9) states that it is of doubtful embryological derivation of undetermined function inconstantly present but occasionally giving rise to tumors of definite structure Funk (8) believes it represents the remains of the upper part of the thymus anlage.

Many investigators such as Zuckerlandl (38) McMurrich (39) Stilling (45) Kohn (46) Keith (47) and others classify it with the sympathochromaffin system anlage which buds off from the central nervous system. Steide (48) Rabl (49) de Meuron (50) and others maintain that it represents an embryonal rest from the third or fourth branchial cleft while Katschenko (42) Paltauf (43) and Monckeberg (44) look upon it as being a connective tissue structure derived from the perithelium of the carotid arteries. It would however seem to be a well-established fact that this carotid body consists essentially of a loose connective tissue capsule and meshwork, containing chromaffin cells similar to those found in the medulla of the adrenals in the pituitary and in the ganglia of the sympathetic nervous system. Physiologically we have at present very little knowledge concerning this body. Experimentally its action on blood pressure is contradictory. The fact that it is not constantly present indicates that its function—if any—is unimportant. However we must remember that the different parts of the chromaffin system while of common embryology possess different functions. Thus the medulla of the adrenals affects blood pressure its cortex has an influence on the development of the sexual apparatus the pituitary seems to possess a trophic influence etc (9).

PATHOLOGY

1 Branchiogenic fistula (a) Complete The proximal (internal) portion is lined with cylindrical epithelium (hypoblastic) the distal (external) portion is lined with flat pavement epithelium. The hypoblastic portion also contains a layer of lymphoid cells in its wall. The discharge consists of clear stringy mucus or of a thinner milky or turbid fluid resembling thin pus. It may also contain particles of fluid or semisolid food.

(b) Incomplete The lining may be wholly of cylindrical epithelium of flat pavement epithelium or a combination of both varieties.

(c) Cysts. These have a wall of more or less dense fibrous tissue containing lymphoid tissue

if the cyst arises from the inner embryonic layer. They are lined with pavement epithelium or cylindrical ciliated epithelium sometimes with membrane containing all the structures of the skin. They are usually unilocular occasionally multilocular. Their contents varies it may consist of clear serous fluid of mucus of oily material or of fatty material of solid or semisolid consistence. The walls may undergo suppurative or degenerative even malignant changes.

2 Thyroglossal (a) Fistula. The deeper portion of the fistulous tract is lined by ciliated epithelium that part nearest the foramen caecum of the tongue with flat epithelium.

(b) Cysts. They are lined with flat or ciliated epithelium.

3 Aberrant or supernumerary thyroids. In the downward migration of the thyroid gland through the thyroglossal duct from the base of the tongue to its final location some thyroid cells may become dislodged and remain along the duct (8). Occasionally the entire thyroid gland may remain sublingual and its removal be followed by myxedema (Murphy 2). These embryonal rudiments may be multiple giving rise later in life to multiple goiters (Jakubowski 25). In general it may be stated that aberrant or supernumerary thyroids are subject to the same pathologic changes which may occur in the parent gland.

4 Hemangioma (cavernosum). These are always in the nature of fissural angiomas. At first they may appear as simple telangiectases when fully developed they present numerous large vascular spaces or sinuses lined with endothelium, resembling the structure found normally in the penis corpora cavernosa.

5 Lymphangioma. Their structure is in most respects analogous to that of the hemangioma save that the vascular spaces contained therein are lymph channels instead of blood vessels. The supporting stroma in which the vessels are embedded may be fibrous fatty or mucous. In the cavernous variety the lymph channels are very numerous and much dilated so that the structure on section has a somewhat spongy texture. The supporting stroma is scanty thin delicate and transparent. Cysts varying in size from that of a pea to that of a walnut or larger may be produced. As in the case of hemangioma the lymphangiomas of the neck occupy or originate at the site of the branchial clefts.

6 Hygroma. These are usually large multilobulated containing as many as one hundred pockets in a single tumor. The cyst walls are thin and consist of endothelial cells supported by a loose connective tissue stroma. They are pecu-

lar in having an independent power of growth sufficient to force them into the surrounding tissues (Dowd 10). Some of them extend from the lower jaw to the clavicle and from the median line almost to the spinous processes of the cervical vertebrae. They have a tendency to penetrate muscles (pseudomalignant) many of them even pass under the clavicle and form an axillary cyst or under the manubrium to the anterior mediastinum (Kirmisson, 4).

7 Dermoid cysts. The majority of cases of dermoid cysts reported were due to imperfect closure of the second branchial cleft. As a rule they are lined with stratified squamous epithelium without other skin structures (epidermoid cysts) occasionally the cyst wall will also contain hairs, glands, and fat (dermoid cysts).

8 Carotid body tumor. From a histologic point of view these tumors resemble endothelioma or perithelioma of the suprarenals (Lillenthal, 11). Their normal size varies from that of a grain of rice to a grain of corn. They reach a certain size when from 20 to 30 years old remain stationary for a time and then the connective tissue only increases. The interlobular blood vessels thicken, with resulting sclerosis and atrophy.

The consistence varies, but the tumor is usually moderately hard and elastic. In color it varies from a reddish gray to a reddish brown. When present, the carotid body is found most commonly a little posteriorly to the bifurcation of the common carotid artery lying between the internal and external carotids, and more closely united to one or the other of them. It is attached to the one on which it lies by the ligament of Mayer through which it receives its blood supply. The nerve supply is abundant and is connected with both the cranial and sympathetic nerves. It receives branches from the vagus and glossopharyngeal superior laryngeal and superior cervical sympathetic ganglion.

Fibers pass from the vagus, glossopharyngeal, and sympathetic, to form a plexus in the angle of bifurcation just in front of the carotid body. Many fibers from this plexus penetrate the capsule of the organ.

These tumors may remain quiescent for many years. Lillenthal's case (11) was that of a woman 60 years of age who had noticed the tumor for 35 years. When malignant changes occur the growth of the tumor and infiltration of the carotid sheath and surrounding tissues may be very rapid. Funk (8) reports a tumor 8x5 cm. with pressure upon or involvement of the superior cervical sympathetic ganglion, causing contraction of the pupil on the affected side.

SYMPTOMS

Subjectively there are absolutely no symptoms in the vast majority of these cases. If old enough, patients suffer from a varying degree of mental distress caused by the visible presence of a disfiguring tumor or fistula they may complain of a sense of tightness in the neck, increased by excitement or overexertion. In the case of multilobular bygromata they have reported a gurgling sound on coughing (due to compression of one cyst by the sternomastoid forcing the fluid content into a neighboring cyst). Fistulae or cysts may however become inflamed or infected, giving rise to the common subjective findings of acute or subacute inflammation.

In a case recently operated upon by the reviewer the patient a woman 72 years old, with an incomplete internal branchial fistula (see Fig 1) had all her lifetime been obliged, after each meal, to evacuate the contents of her cystic fistula into the pharynx, semisolids and liquids being forced into the sac during each act of deglutition. Notwithstanding this repeated traumatism, it was only within recent months that the fistula had become infected occluding its lumen with subsequent putrefaction of the contents of the cyst. The inflammatory symptoms alone, brought her to the operating table. Of special interest are the subjective symptoms of imperfect closure of the upper portion of the thyroglossal duct forming what might be termed an exaggerated foramen caecum. Dr T W Lewis of Chicago has reported (but not published) several such cases. The patients suffered from spasmodic cough and irritation of the pharynx which was relieved only by cauterization of the foramen usually to the depth of one-half to three-quarters of an inch. In every case reported by Doctor Lewis touching the opening of the foramen caecum with the tip of a probe invariably produced an attack of severe spasmodic coughing.

Even carotid body tumors give rise to few subjective symptoms until they begin to infiltrate the carotid sheath producing pressure symptoms on the vagus, superior laryngeal, and superior cervical plexus of nerves (disturbances of phonation, dysphagia, dry cough, deafness, conjunctivitis).

Objective (a) Fistula. If of the second branchial cleft, the external opening lies in the skin of the neck, between the anterior border of the sternomastoid muscle and the median line anteriorly and between the greater cornu of the hyoid bone and the sternoclavicular joint of the same side. The external opening is usually very

small often so small as only to admit a filiform guide or a bristle. The inner opening lies in the neighborhood of the tonsil in the lateral wall of the pharynx, or near the pillars of the fauces. In the complete fistula it is sometimes possible to inject fluid through the external opening into the pharynx the passage of the fluid into the pharynx may be recognized by the patient by its taste or by the surgeon by its color (strychnine quinine milk or methylene blue solution) (60).

The discharge from a complete fistula is a thin clear mucus that of an incomplete external is thicker and more turbid while the incomplete internal variety discharges a thick mixture of mucus and epithelial or endothelial elements admixed with particles of more or less decomposed food.

A fistula of the thyroglossal duct is always median between the lower margin of the hyoid bone and the sternal notch. Branchiogenic cysts are single soft freely movable not tender (unless recently inflamed) and are never in the median line. Thyroglossal cysts are usually smaller and always in the median line. Collison and MacKenty (9) describe the objective findings of a carotid body tumor as follows:

(1) Early. A tumor varying in size from a kernel of corn to a robin's egg situated under the sternomastoid or at its anterior margin. It is egg-shaped single discrete firm elastic moves easily laterally but not vertically is pulsating (but not expansile) and may give a bruit on auscultation.

Late. Paralysis of vocal cords (due to involvement of recurrent laryngeal nerve while its fibers are still within the vagus) difficult phonation and deglutition congested larynx irregular pupils with no reaction to light on the affected side lessened mobility of tumor loss of weight and progressive cachexia (10).

F. S. Mathews (11) reports a case in a man years old of presenting hemiatrophy and paralysis of the tongue in addition to other classical findings. The left side of the pharynx was pushed inward and the left tonsil occupied a position near the median line.

DIFFERENTIAL DIAGNOSIS

O. C. Smith (6) has worked out a very exhaustive outline of tumors of the neck which the reviewer appends in full.

1. Inflammatory

(1) Acute

Parotitis submandibular adenitis
Cervical lymphadenitis
Furunculosis
C. rhinoid
Anthrax cymomyces
Echinococcus

(2) Chronic

Chronic lymphadenitis
Tubercular syphilis ad
Hodgkin disease
Mikulicz disease

2. Embryologic malformations

Branchial cysts
Thyroglossal cyst

3. Neoplasia

(1) Benign

Lipoma fibroma chondroma
osteoma sebaceous cyst
angioma
(1) Hemangioma
(1) Lymphangioma
Hidradenoma
Teratoma
(1) Dermoid cyst
(1) Medulla thyroidalis

(2) Malignant

Carcinoma (epithelioma)
Sarcoma
Lymphosarcoma

4. Tumors of special organs

(a) Thyroid

(1) Phylloides hyperplasia at puberty
menstruation and from
(2) Colloid adenoma glandular with
out cysts
(3) Parenchymatous hyperplasia
(4) Follicular adenoma
(5) Malignant disease

Carcinoma
Sarcoma

(b) Carotid body tumor

(c) Aneurysm of a carotid artery

(d) Tumors of larynx

The true nature of a fistula of the neck can be ascertained readily by inquiring into the history of the case. Only branchial or thyroglossal fistulae are congenital. Tubercular adenitis late carcinomata or sarcomata and lymphangiomata or hygromata (the last two only as the result of exploratory puncture or traumatism) may give rise to fistulae. Cysts of the neck must be differentiated from the following: (1) cervical lymphadenitis (2) carcinoma (3) sarcoma (4) fibroma (5) lipoma (6) Hodgkin's disease (7) syphilis (8) aneurysms (9) aberrant or supernumerary thyroid (10) carotid body tumor.

TREATMENT

The correct treatment of congenital deformities of the neck is to leave the benign cases alone unless their removal is desired for cosmetic reasons or on account of inflammatory pressure symptoms and to remove early and radically growths having a malignant or pseudomalignant tendency such as lymphangiomata hygromata and carotid body tumors. It should become axiomatic for instance that a solid tumor of long standing situated in the anterior triangle of the neck at or near the level of the lower border of

DIFFERENTIAL DIAGNOSIS OF CONGENITAL

Tumor	Age	Location	Single or Multiple	Consistency	Superficial or deep	Mobility	Fluctuates
Branchial cyst	Congenital	Anterior triangle of neck	Single	Soft	Superficial; may extend deeply	Movable unless infection has occurred	Present
Thyroglossal cyst	Congenital	Median line below larynx	Single	Soft	Subcutaneous	Freely movable	Usually present
Lymphadenoma	1 month	Anterior or posterior triangle	Multiple as rule, often matted together	Hard at first, later softer	Fork as rule	Slight or absent	Absent early
Carcinoma	Adult	Depends on site of primary focus	Multiple nodes	Heavy hard except in late cases; skin may form tumor	Deep	None	
Sarcoma	Youth or middle life	Angle of jaw sternomastoid	Multiple nodules	Softer than carcinoma	More superficial than carcinoma	Early mobility	
Fibroma	20-45	Very rare in this location	Usually single	Hard	More superficial	Freely movable	
Lipoma	Any age	No anatomic boundaries; not uniform	Single or multiple	Doughy or waxy soft	Superficial	Movable in all directions	
Hydatid's disease	10-40	Posterior rule	Multiple in chains or discrete	Softer than any other tumors; harder than tuberculous glands	Feel like lipoma; but are more deeply seated	Movable	
Syphilis	Any age	Submental or submandibular; look for chancres	Single or multiple	Hard; painless adenitis	Both	Early hard	
Hygroma	Congenital	Inferior angle to clavicle; may pass in axilla or anterior axillary line	Multiple; there may be one or two pockets	Soft	More superficial than carotid body tumors	None	May reach enormous size long
Anastoma	Middle age especially	Carotids especially	Single; usually fusiform	Soft	Deep or rule	Usually none	None
Carotid body tumor	20 to 50 in 1st 2nd 3rd 4th 5th 6th 7th 8th 9th 10th 11th 12th	Under sternomastoid or at its anterior border	Single, egg-shaped discrete	Firm but elastic	Deep	Lateral mobility but no vertical mobility	None

the thyroid cartilage, should be looked upon as a possible carotid-body tumor and removed before it involves the surrounding structures—particularly the carotid sheath. The general modus operandi is essentially that of the radical removal of tubercular glands of the neck. Bearing in mind the probable embryologic derivation of the fistula or tumor one should resort to a careful dissection of the growth while constantly bearing in mind the tissues and structures which are to be avoided. In the extirpation of hemangioma, the reviewer has made use of couglene Kocher Fonio in order to minimize hemorrhage (6r). A 5 to 10 per cent solution is injected around the base of the angioma just prior to its excision. Extirpation is much facilitated thereby. The radical extirpation of a complete branchio-genic fistula requires painstaking care. A small probe or urethral catheter (Dowd 5r) may be

passed through the external opening as far up as possible. A circular incision is then made around its external margin so as to leave a disk of skin around the stoma of the fistula. This is followed by the usual oblique incision parallel to the anterior border of the sternomastoid, including skin superficial fascia and platysma. The sternomastoid is retracted outwardly and the dissection will proceed easily as far as the bifurcation of the carotids. From this point on no sharp or pointed instruments should be used. The final dissection—up to the pharyngeal wall—becomes a slow process of teasing out the fistula from the surrounding tissues. With the patient's mouth held open and using a head mirror tugging on the fistulous tract will cause a dimpling in below the tonsil or on the lateral pharyngeal wall. Having freed the entire tract one of three procedures may be employed to

MALFORMATIONS OF THE NECK

Gurgling	Pulsation	Bract	Specific reaction	Fistula	Course	History	Causes	Variation
Noise	Noise	Noise		May be present easily open in mouth or externally	Slow	Congenital		Clear or turbid fluid
				Rarely present	Slow	Congenital		Clear thin light fluid
Noise			T. bercula	Lat broken down areas	Sub cuts	T. berculous		F. in lat
				Only in terminal stage	Rapidly progress	Primary focus	Prest	
				Only in terminal stage	Progress		La	
					Chronic			
					Chronic			
			Blood picture splenomegaly		Progressive	Irregular progress	Lat	
			W. ascending point			Chronic et		
				Only in terminal stage	Fairly rapid et. tends but not facial layers esp	At begin side of be spreads rapidly		Clear thin fluid
Present	Expire in left in 1 normal artery pulse on affected side	Present	W. ascending point		Fairly rapid	Syphilis		F. lat
	Present but not esp side	Present			Long history of slow growth	Rather sudden change in malformation	Only in lat	

complete the operation Von Hacker (54) cuts off the fistula three-quarters of an inch from the pharyngeal wall. An eye probe or small catheter is then pushed through the fistula into the pharynx and sutured to the distal end of the tract. By traction through the pharynx, complete inversion is obtained. The stump usually separates or tears away readily from the mucosa. The opening thus left is sutured with catgut. Wishing to preserve the entire cyst and tract in one of his cases the reviewer proceeded as follows: Having dissected the tumor up to the pharyngeal wall two clamps were placed on either side of the tract in such a manner as not to occlude its lumen. A third clamp was then placed squarely across the neck of the tumor just distal to the guy clamps and the mass removed *in toto*. The remaining fistula was then cauterized with pure carbolic acid and a catgut ligature thrown

around the guy clamps proximal to them and tied. The clamps were then removed and the incision closed without drainage. The result was perfect. For those cases where adhesions to the carotid sheath make complete dissection impossible or extremely dangerous Koenig (53) has devised an ingenious method of treatment. He frees the distal end of the fistulous tract as far as he can and then passes this free (distal) end through the mucous membrane in front of the tonsil and stitches it there thus leaving a curved sinus with an internal opening at each end—the posterior one pharyngeal the anterior one buccal.

Thyroglossal fistulae or cysts should always be injected with methylene blue and every particle of stained tissue removed. The usual procedure has consisted in shelling out the cyst as far as the hyoid bone. Inasmuch as the tract invariably passes either through or behind this

bone, cures have only been effected in those cases where the duct is represented by a fibrous cord proximal to the hyoid. Recurrences have been the rule. McKenty (13) mentions one case where three successive operations were necessary, even then he does not state whether the third operation was a permanent success. Chiseling or drilling through the hyoid bone, followed by cauterization, is recommended in obstinate cases.

The extreme thinness of the walls of a hygroma makes a clean dissection of the entire tumor almost a surgical impossibility. Portions will tear and remain behind, leading to extremely rapid recurrences. Dowd (10) operated on a girl not quite three years old removing the cyst as far as the sternum. It promptly recurred and at the second operation he was obliged to extend his dissection as far back as the scalene muscles. This case died on the tenth day from shock and hemorrhage. A preliminary injection with methylene blue is absolutely indicated in these cases.

The operative mortality of carotid-body tumors is formidable. Collison and Mackenty (9) collected 60 cases up to the year 1913. Of these, 54 were operated upon. In 4 cases, the operation was merely exploratory in nature in 31 the common external and internal carotids were ligated in 7 only the external carotid was ligated in 15 cases the tumor was dissected away from the blood vessels or dissected away from the internal carotid or the common carotid after ligation of the external. Recurrences occurred in 6 of these 15 cases whereas only 2 recurred after complete removal of all the carotids. Immediate death occurred in 11 cases of the 43 who convalesced 4 had prompt recurrences and in 6 other cases speedy deaths were in prospect from recurrences known to have existed when the cases were reported. We thus have an operative mortality of 25 per cent and a prospective mortality of 40 per cent, a far from encouraging outlook. Desgouttes (1) reports the successful removal of a tumor *en bloc* with the internal jugular vein and the pneumogastric, the internal carotid being saved. He has also successfully removed the pneumogastric the sympathetic plexus, the internal jugular and the internal carotid in another patient. He does not state however whether or not either of his patients succumbed to recurrences. Lillenthal (2) ligated and resected, above or below the tumor mass, the internal jugular and all three carotids, saving the pneumogastric. Twenty-four hours after the operation his patient developed central

aphasia and right hemiplegia. There was no aphonia but the left eyeball softened and its pupil contracted. All symptoms except the contracted pupil disappeared in a few days. He ascribes the pupillary contraction as probably due to injury of the superior sympathetic cervical ganglion. It is therefore self-evident that a large percentage of these tumors will be considered inoperable by conservative surgeons. If seen early dissection away from the carotid bifurcation leaving the vessels *in situ* has been suggested (9) in all other cases if operation is undertaken, the mass should not be dissected away from the blood vessels but the carotids and internal jugular vein should be removed *en masse* after freeing the pneumogastric.

SUMMARY

1. The pre-operative diagnosis of congenital deformities of the neck is all too seldom made. A careful history and examination of the deformity oftentimes aided by the injection of either bitter tasting or coloring substances, will enable the surgeon to make a correct pre-operative diagnosis.

2. No operation should be undertaken unless the surgeon is prepared to carry the same to a complete conclusion. Partial removal of a secreting wall is worse than leaving it *in situ*.

3. The desirability of operating on carotid-body tumors must depend on (1) a very early diagnosis, while the tumor is still benign (2) in late cases, on the desperate nature of the patient's symptoms (paralysis of vocal-cords stenosis of pharynx, hemiplegia, hemiatrophy paralysis of tongue, etc.)

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ABSTRACTS OF CURRENT LITERATURE

GENERAL SURGERY

SURGICAL TECHNIQUE

OPERATIVE SURGERY AND TECHNIQUE

Grant, W. W. The Immediate and After Treatment of Railway Injuries. *South. M. J.* 9:6 11, 357

The circumstances, conditions, and environment of railway injuries are unfavorable to the best treatment so that tentative measures only should be used until the patient is in more favorable surroundings. The immediate application of hydrogen peroxide and iodine with dry sterile gauze is recommended for wounds. Fractures should be temporarily immobilized.

Hemorrhage is a common condition in railway injuries and many times is incorrectly treated. Pressure to stop the hemorrhage should be used for as short a time as possible as tissue necrosis and subsequent sloughing may result from prolonged anemia of the parts.

Shock is frequently unscientifically treated and its presence many times disregarded. No serious operation should be performed in the presence of shock. Combat shock, dry heat applied to the body, hypodermoclysis, rectal saline, and sugar solutions are recognized agents.

Fractures should be treated if possible without the open method, especially should all compound fractures be left alone as regards surgical approximation of the fragments, for at least ten days or two weeks following the accident.

Conservative surgery as regards feet and hands is very important. Ragged wounds should be left open to allow free drainage. Muscles, tendons, and nerves should be carefully sutured. Skull fractures should be carefully explored and all fragments and bone debris should be removed.

J. H. SUMNER.

Barclay, A. E. Preliminary Note on New Method of Bullet Extraction. *Arch. Radiol. & Electrotherap.* 9:6 11, 359.

Barclay's method is an elaboration of the scheme of marking the location of foreign body by inserting a large needle into the tissues until the body is reached, using the fluoroscope to guide the needle. Instead of inserting a needle he uses two prongs, one longer than the other, the point of the shorter prong fitting into the depression near the point of the longer one to make the insertion easier. The outer ends

of the prongs have handles arranged at right angles to avoid the screen and made like scissors so they can be opened and closed. He has also arranged his instrument electrically so that a bell rings when metallic body is in contact with the prongs. Fourteen cases are reported in which the foreign bodies were removed with a small skin incision and without the mutilation of tissue usually required in such cases.

J. O. BURN.

Cathcart, C. W. Methods of Preparing Sphagnum Moss as a Surgical Dressing. *Lancet, Lond.*, 9:6 11, 830.

A description is given of a simple and economical method of sterilizing sphagnum moss. The absorbing qualities of the moss are superior to cotton wool. The moss is first picked clean of grass and leaves and suitable quantities are placed in small flannel bags which are immersed in bichloride solution so that the moss is impregnated with one-fourth of one per cent of bichloride of mercury. The bags are then hung up to dry in a room heated with a slow combustion stove. They are then compressed by an ordinary clothes wringer and are ready for packing. Care must be taken in shipping that the moss is not exposed to moisture, otherwise it will swell and burst the packing boxes.

H. G. SLOAN.

Tovey, D. W. The Nerve Supply of the Lower Abdominal Wall as Related to the Pfannenstiel Incision. *Am. J. Surg.* 9:6 11, 145.

Special care should be taken in any abdominal incision not to injure the nerves supplying or crossing the cut structures, since such nerve injury predisposes to hernia by causing paralysis of muscle or atrophy from disturbed nutrition or loss of sensation.

The course and distribution of the nerves of the lower abdominal wall are described, especially those which may come in the field of a Pfannenstiel incision, principally the anterior divisions of the twelfth dorsal and the hypogastric branch of the first lumbar.

In the Pfannenstiel incision, after the aponeurosis has been separated from the muscle and the linea alba divided and the upper flap retracted, two or sometimes four large nerves can be seen coming up from the recti about an inch from the median line.

and piercing the anterior fascia. These are the anterior divisions of the twelfth dorsal nerve. They are often half as thick as a match, double and accompanied by a blood vessel. They should not be cut as in retracting the upper flap they can be drawn out sufficiently in nearly all cases. The cutting of these nerves according to Tovey may account for the reported cases of hernia following the Pfannenstiel incision. LUCIAN H. LUDWY.

MacLennan. A. The Prevention and Treatment of Some Obscure Conditions Complicating Convalescence After Gastro-Enterostomy. *Glasgow M J* 1916 lxxxv 3 3

MacLennan considers the undesirable sequences of gastro-enterostomy and describes an operation by the adoption of which these sequelae may usually be prevented. The steps are as follows:

1. Except in infants the new stoma is made on the pyloric side of the lowest point of the great curvature.

2. The colon is raised so as to display the mesocolon—that area which is free of vessels yet contiguous to the selected spot on the stomach wall is divided vertically to the necessary extent.

3. The stomach is drawn through the slit in the mesocolon and clamped perpendicularly, occasionally with a slight inclination toward the pylorus but never with the inclination toward the left. The omentum and colon are then returned into the abdomen.

4. The bowel to be attached is emptied by digital pressure and clamped when flat.

5. One continuous Lambert suture (silk) unites the two surfaces along the line which is sickle-shaped at the lower end and which is just off the free edge of the bowel. At the end of the line the thread is hitched under the last loop and caught lightly in a pair of pressure forceps, so applied that the serrations of the forceps cannot cut the silk.

6. The stomach is opened and a small circular section is removed from the entire thickness of the wall corresponding to the curvature in the line of the Lambert suture, making a racquet-shaped opening. The same is done to the bowel, but on no consideration is the mucous membrane of the latter excised in the slit part. The redundant mucous membrane at the upper part of the stoma offers some impediment to the entrance of bile, while the cutting out of a section of stomach and bowel leads to the formation of a gaping hole over the mouth of the efferent jejunum and facilitates evacuation of stomach contents.

7. The operation is concluded by suturing the openings together with catgut and then continuing the Lambert suture, which has been laid aside. A little of the girth of the bowel is taken up as possible. The junction is placed inside the lesser peritoneal cavity by uniting jejunum to the opening in the transverse mesocolon for the greater safety thus gained in localizing possible leakage.

In the author's opinion bleeding from a duodenal

or pyloric ulcer forms the sole indication for closure of the pylorus. Where hemorrhage has occurred all large vessels going toward the site of the ulcer are ligated. Closure of the pylorus has no influence in preventing bilious regurgitation.

Following gastro-enterostomy morphia is allowed during the first twenty-four hours only. The Fowler position is used, rectal saline is given every four hours, a dessertspoonful of brandy and glucose on raulin tea being generally included. During the first twelve hours nothing is swallowed though the mouth is frequently washed out with ice water. During the second twelve hours sips of water acidulated with lemon juice are given every quarter hour. During the next twenty-four hours the water is increased to a half ounce while during the latter part of this time dessertspoonfuls of butter milk are given. On the third day the diet consists of beaten curds, buttermilk, lemon tea, coffee with oat milk, and sugarless stewed apples. On the fourth day calomel is administered (about 3 grains) in one-half grain doses every quarter hour. This is followed by a sudorific enema containing asafetida, quinine or turpentine. Three daily scrambled egg, banana and cream, malted milk or fish cream in addition to the sour milk, apple, etc., is given. Thereafter the diet is gradually increased until at the beginning of the second week fruit (cooked or uncooked), chop, fowl and fish are included. A sour wine may be taken advantageously with the meaty meal, but fresh milk after gastro-enterostomy must be avoided. Bilious regurgitation without vomiting in cases with urgent symptoms requires the stomach tube. After siphoning the stomach should be washed out with warm water and a few ounces containing a tablespoonful of vinegar left in. Small doses of opium or better one twentieth grain of heroin may be given thrice daily to encourage gastric contraction, and retard the secretion of bile.

The mechanism of bilious regurgitation is well called a vicious circle for the presence of bile induces conditions which encourage its continuance. In the presence of alkali the stomach relaxes and the extra weight of the fluid increases the sagging of the organ whose capacity for holding bile is further enhanced. As the overfilled organ sags it inclines to close its exit by obliterating the lumen of the jejunum. The position assumed by the patient then becomes of importance in so far as it may relieve a downward pressure. Under these conditions also vibratory massage is efficient. Heat is comforting and assists in the return of gastric tonicity. In the acute states of regurgitation, champagne to 4 ounces will speedily produce amelioration. A peppermint liqueur is excellent for occasional bilious regurgitation.

ALBERT LURE FRIED

Weeks. A. A Simple Method of Giving Solutions by Bowel. *J Am M A* 1916 10 1

After numerous experiences in watching the routine use of the Murphy drip after operations in various hospitals the author came to the conclusion

that half of the distress complained of by patients is due to the retention in the bowel of gas or too much fluid. This is especially so in little children.

For some time he has used a method which consists of the usual container and dripper supplied by all hospitals with small glass funnel, a funnel holder which will fit on the container and 5 feet of rubber tubing, with a glass tip and an ordinary rubber catheter to suit the case. The funnel hangs on a level with the patient's abdomen. The container is hung so that the dripper will drip into the funnel. The solution is allowed to drip only as fast as it is absorbed, and it is not necessary to keep it warm.

LOW ED L CORNWELL

ASEPTIC AND ANTISEPTIC SURGERY

Emery W D A Standard Method of Testing Antiseptics for Wounds, with Some Results. *Lancet*, Lond., 9 6, cxc, 8 7

The author has aimed to test antiseptics under the same conditions as when they are ordinarily applied to wounds. He uses blood as a medium because of the presence of blood in all fresh wounds, and further because pus which would be the ideal medium is difficult to obtain of a uniform type. Washed corporals were added in an equal amount of serum so that there would be no clotting while the experiments were being carried on.

He used the streptococcus faecalis in testing the potency of the various antiseptics because it is the chief enemy in wounds. It can always be obtained in pure culture, it grows rapidly so that the results can be secured in twenty-four hours and furthermore it readily emulsifies so that there are no masses to resist the action of the antiseptic. In the technique he uses nine parts of blood and one part of 18-hour culture of the streptococcus, containing about 50,000,000 cocci per ccm. This solution was thoroughly mixed with an equal quantity of the antiseptic to be tested on a glass slide. Equal portions of this mixture were then sucked into two capillary pipettes and the ends sealed. Pipettes were then incubated, one for fifteen minutes and the other for one hour and at the end of this time two loops from each pipette were inoculated on the surface of an agar plate. These plates were then incubated and the number of colonies determined after twenty-four hours.

Some antiseptics show fewer colonies after fifteen minutes than at the end of one hour because of their faculty for combining with the protein in the medium in which the bacteria are mixed. This neutralization of the antiseptic with the protein has very nearly passed off at the end of an hour so that the remaining bacteria flourish more at this later period.

Emery found that by this method Dakin's solution was only one-seventieth as powerful as carbolic acid. It was one-fourth as powerful as biniodide solution, one-thirtieth as strong as lysol, and one-two-hundredth as strong as malachite green. Un-

fortunately the action of this last antiseptic on the living cells is too powerful for clinical use.

The end result of any antiseptic, in wounds, is a combination of its action on the infecting bacteria, coupled with its action on the fixed body tissue cells. This latter factor the author has been unable so far to determine accurately but he is working on this problem.

HARRY G SLOW

ANÆSTHETICS

Stanley L. L. Spinal Anesthesia; Analysis of Two Hundred and Eighty Cases. *J Am. M. A.* 9 6, lxxi, 000

In the 80 cases in which spinal anesthesia has been used on the inmates at the San Quentin, Cal., prison tropacocain in 5 gr doses has been the agent employed.

In ordinary operations excepting those in which the abdominal viscera are handled no hypnotic is given to the patient before the operation. The patient walks to the operating room and mounts the table. Within one minute he feels that his feet are becoming warm and he may even feel a tingling sensation in his toes. Within two minutes, sensation is lost about the anus and, as a rule, within about four minutes the loss of sensation is so great that operations for hernia may be done without pain. For operations above the umbilicus the patient is allowed to stay in the Trendelenburg position for six or seven minutes, for apparently it takes that long for the tropacocain to gravitate cephalad to bathe the nerves which supply these segments. For operations about the anus the average Trendelenburg position has been 7 minutes for operations on varicose veins, 5 minutes for operations on the sacrum, 4 minutes for hernia, 3 minutes and for gastro-enterostomy 4 minutes.

The conclusions are as follows:

In this series of 80 cases there has been no fatality.

There has been comparatively little shock.
3. There has been headache in only 8 per cent of cases.

4. There has been no pneumonia following the operation.

5. There have been very few post-operative complications.

6. There have been no permanent paralyses following the anesthetic.

7. The period of convalescence has been short ended.

8. With the relaxed muscles, closing of the abdomen is greatly facilitated.

9. The blood pressure has fallen in most cases but in the average case not to a dangerous degree.

10. The height to which the anesthetic is effective is influenced by the length of time the patient is in the Trendelenburg position.

11. The pulse-rate is not influenced by any marked degree by tropacocain intraspinally administered.

EDWARD L. CORNWELL

Mahn G: *Practical Notes on Local Anesthesia in Otorhinology* (Notes orales sur l'anesthésie locale en oto-rhinologie) *Ann d'otol et de l'oreille* de la Soc. Par. 1916 1: 835

In most interventions in the frontal and maxillary sinuses or in the maxilla not alone must the superficial layers be anesthetized but also and especially the bony walls internally as well as externally trepanation of these cavities being usually followed by curettage. In order to obtain this result the author says that it is necessary and sufficient that the injection should be pushed into the exterior periosteal layer. But the anesthesia will be more perfect if a large part of the periosteal surface enveloping the cavity is injected.

The author uses a novocaine solution and three hours prior to its use he makes a hypodermic injection of pantopon or morphine. His technique is given in detail. W. A. BRENNAN.

Kroenig B and Siegel P W: *Shockless Surgery with the Help of Paravertebral Anesthesia and Scopolamine and Narcophin* *Surg. Gynec. & Obst.* 9: 6 Jan. 5: 4.

Kroenig reports 670 cases of gynecological and obstetrical operations done under paravertebral anesthesia at the University Frauenklinik in Freiburg Germany.

The method consists in blocking the nerve trunks directly at their exits from the intervertebral foramina or from the sacral foramina for the sacral nerves with a one half per cent solution of novocaine suprarenin tablets. A prepared by Hoechst Farbwerke. The anesthesia is preceded by two-thirds to one gram of veronal on the night before the operation and 0.003 gr scopolamine and 0.03 gr narcophin two and one fourth and one and one half hours respectively before beginning the anesthesia, and half a dose of each one half hour before anesthesia if the twilight sleep is too light. For cachectic patients or patients weighing under one hundred pounds the dose is reduced to 0.00225 gr scopolamine and 0.0225 gr narcophin respectively and 0.00075 gr scopolamine and 0.075 gr narcophin for the last dose if necessary. The anesthesia continues uniform from two and one half to three hours and operation may be begun from fifteen to twenty minutes after anesthetization.

The complications noted are of minor importance and may result from the condition of the patient or from the operation itself. No deaths resulting from the anesthesia were noted. An attempt was also made to eliminate post-operative pain by dusting a powder called anesthesin into the wound as it was closed by layers. Apparently a reduction of pain was accomplished in most cases and in some there was a complete elimination of post-operative pain but the resulting edema in the wound and retardation of healing seem to be factors that more than outweigh the slight advantage gained and the use of this powder has been discarded for the present.

1 preceding the anesthesia with scopolamine and

narcophin eliminates the psychical shock due to the preliminaries of an operation and patients often have no recollection of anything from the time they receive their veronal on the night before operation until they recover full consciousness three to six hours after the operation.

The variety of operations done under this form of anesthesia indicates its general applicability in general surgery as well as in gynecology and obstetrics and the success of the Freiburg clinic warrants a fair trial by the profession. The technique is not as difficult as it might seem and requires only a definite knowledge of the distribution of the sensory nerves or working according to the rules applied by experienced users of this method.

With the elimination of the post-operative pain upon which problem the Freiburg clinic still works the method presents the advantages of anesthesia. Its chief advantage lies in the uniformity of the anesthesia obtained in the least serious immediate or post-anesthetic complications.

SURGICAL INSTRUMENTS AND APPARATUS

Thompson G S: *Some Surgical Uses of Celluloid* *Brit J Surg.* 19: 6 Jan. 1906.

Celluloid used for surgical purposes varies in thickness from that of ordinary photographic films to that of thick cardboard. In cases where it is desirable that it become encapsulated it should be perforated with pin holes throughout. When infection does not occur the celluloid does not provoke irritation of the tissue sufficient to cause subsequent sinus formation or the extrusion of the celluloid. The celluloid is sterilized in the autoclave or by boiling. If crinkling is to be avoided the material must not be boiled for a long period. It is not an absorbable material.

Thompson suggests that celluloid might be used to advantage in the various types of hernia. The precautions necessary to be observed in its use are pointed out by the author. In femoral hernia the plate should be triangular in shape and should be provided with a flange on its outer border where it comes into relationship with the femoral vein. The plate for inguinal hernia should be roughly elliptical and should have a gap for the passage of the cord at its lower border. In the skull thick plates are used fashioned to suit the aperture. Perforations are avoided. Celluloid will be found preferable to other material such as transplanted bones—phalanges, pieces of rib etc. in plastic operations on the nose for restoring the bridge. Thompson suggests the possibility of using celluloid caps for the ends of bones after certain operations. For this purpose he suggests that there be kept on hand a series of casts and molds in different sizes corresponding to the commoner joints involved. The celluloid is softened and applied to the cast and it is then worked into shape with the molder. The whole is then placed in cold water to harden.

It is suggested that celluloid be used for medullary pegs after fracture. The advantages claimed for the medullary peg of celluloid are: It is not brittle; it gives perfect alignment; does not interfere with osteogenesis, and therefore does not favor non-union; causes only slight disturbance to parts; causes no discomfort to the patient; it requires only a minimum of trauma for its introduction; the operation is rapid. In the author's opinion the alleged defects of pegs do not exist, and granted correct technique, gratifying results may be anticipated. He believes that this method is destined to supersede the others.

Spina bifida is a condition in which ideal closure of the gap can be made by a properly shaped celluloid plate. A flame-proof celluloid known as "taruloid" is now on the market. IMMORE CORN.

Johnson, C. G. Fracture Splints. *Lancet-Clin* 9 6 xvi, 373

The author uses tin as material for splints, and believes it most practical especially for the country practitioner. The tin splint is most advantageous because it is light in weight, is firm and strong, is capable of being molded, and can be sterilized.

J. R. MARTIN

SURGERY OF THE HEAD AND NECK

HEAD

Von Hacker. The Plastics of Penetrating Cheek Defects Due to Gunshot Injuries. (*Plastik bei penetrierenden Wangen Defekt und nachfolgender naherliegender Kieferklemme insbesondere nach Schussverletzungen*) *Beitr. klin. Chir.* 9 6 xxviii, 89

Von Hacker's method of remedying defects of the cheek due to gunshot wounds is divided into two stages.

In the first stage an Israel flap is cut from the cheek down the neck commencing close to the defect but in such a way that a strip of skin is left between the defect and the flap. This strip is termed the bridge. The flap which hangs from the cheek, is turned over, passed under the bridge, and part of it covered over the defect. This is sutured to the edges of the defect and the former outer skin surface of the flap thus forms the interior lining of the mouth at the defect. The edges of the flap site are approximated.

The second stage of the operation takes place when the flap has healed in the defect. This consists in severing the lower edge of the bridge and with this and the unused portion of the turned over skin flap patching over the external surface of the defect and approximating edges.

The author illustrates his procedure by several diagrams clearly showing the steps of the operation. He also shows some photographs of the excellent results obtained. He points out that his method by allowing the flap to be nourished during the healing process prevents necrosis and is thus superior to other methods in use. W. A. BARNARD.

Perry R. St. J. Pons Nasal. *Am. J. Clin. Med.* 9 6, xiii, 309.

The author describes in detail the method of making a plaster cast of the nose in deformities thereof.

An attempt is then made to correct the deformity by one or more procedures. Submucous resection with straightening of the nasal bones may give the result desired. When depressed areas are present a piece of cartilage from a rib may be inserted to fill out the nasal contour. When unsightly pro-

jections are present these may be curetted off subcutaneously with a special spokeshave. An injection of paraffin must sometimes be resorted to finally. J. H. SKINNER.

Vilvandré, G. Radiography in Gunshot Wounds of the Skull. *Arch. Radiol. & Electrophys.* 9 6 xi, 306

The point which the author wishes to emphasize is that owing to the bad prognosis in lesions in which foreign body has lodged in the brain, an operation should take place on a skull which has not been previously radiographed to ascertain the presence or absence of a foreign body and its careful localization.

To trephine a skull for depressed fracture will of course give relief, but a patient with a bullet or piece of shrapnel in his brain will, with perhaps a few remote exceptions, die within six months of cerebral abscess. The only exception which might be allowed is that in which the bullet is not distorted through a previous ricochet and is in all probability aseptic. The first point can be determined by the X-ray. HOWARD E. POTTER.

Lee, J. R. Removal of Intracranial Foreign Body Under X Rays. *Bull. M. J.* 9 6 i, 447

Attempts to locate a piece of shell in the occipital bone with probe or to remove it with an electromagnet having been unsuccessful, the X-ray screen was tried. The operator was clearly able to see a probe which had been passed in along the track and the fragment which had been pulled forward by the magnet and was caught in brain tissue. Removal of the fragment was effected by means of a crocodile forceps passed along the track to a depth of four inches. Noting the relation of the fragment to the instrument during the process of removal may prove of material assistance.

L. K. ARMSTRONG.

Whitaker R. Gunshot Wounds of the Cranium. *Bull. J. Surg.* 9 6 iii, 706.

The author reviews the results of his observations on 106 cases of cranial injuries which have been re-

ceived for treatment from seven to ten days after the injury. Of this number 88 were penetrating or perforating wounds of the brain.

The operative treatment originally advocated by Sir Victor Horsley was the method of procedure adopted in these cases. It is in the main as follows:

1. The injured and septic area of the scalp must be freely excised.

2. The injured area of skull must be freely exposed by suitable incisions and turning down suitable flaps.

3. Normal dura mater must be freely exposed around the entire circumference of the wound which it penetrates by a wide removal of bone. Foreign bodies, blood and pus must be removed from the brain without breaking down protective adhesions. The whole wound must be left open from the start.

In wounds where the bullet has perforated the brain the wounds of entrance and exit must be treated alike. When the wounds of entrance and exit are close to one another the two openings are joined — a new factor that of decompression is appreciated in the treatment of these cases. It soon became apparent that these cases did better than those in which the wounds of entrance and exit were not so close together. Cerebral hernia in these cases did not become strangulated but ultimately retired inside the dura mater which in the end became slightly concave. Whitaker has made it a practice to remove those foreign bodies and fragments of bone which are obvious but he has not searched at length for them as he has found that the brain is far more able to take care of itself in this direction than is ordinarily believed.

The length of time taken for the operation is an important factor in preserving the patient's life. Speed and free decompression have been the dominant ideas in these cases. The type of infection has been an important determining factor. Streptococcal infection has been fatal in 90 per cent of cases. It is not usually associated with the formation of adhesions; the hernia grows rapidly and is not covered by a protective membrane. In the cases showing a staphylococcal infection the patient makes an amazing fight when death occurs it is due to infection of the ventricles through a narrow track. These cases show a marked protective covering for cerebral hernia.

As to the technique employed, chloroform and oxygen have been given. The local preparation of the scalp consist in washing with petrol, with methylated spirits and then with iodine. From the beginning of the operation the wound area is continuously irrigated with 1:50 carbolic. Bleeding vessels are ligated but forceps are left on for twenty-four hours. Bleeding from the dura and sinuses are dealt with by muscle grafting.

The muscle graft not only serves to control hemorrhage but it serves as a center for granulation formation. When the bony parts are removed the irrigating fluid is changed to hydrogen peroxide. All obvious foreign bodies are removed and the

wound dressed prior to this. No ever an unperforated piece of rubber is placed over the dura. The wound is dressed with a 1:50 carbolic or iodoform gauze. Morphine is given as needed. Uroline is the only other drug given to control pain. 6 hours. The first dressing is applied after 6 hours and the rest as required.

Lumbar puncture has been used in only a few cases in this series. The effect of lumbar puncture are very transitory. A permanent cannot fail to mean an added strain on a system that has already as much as it can bear.

Under good conditions a patient has every case of fracture of the skull that is operated upon within the first three or four days at the hospital when cases are rare after seven days it is probable that the patient cannot survive. The definite clinical picture is one of increasing intracranial pressure. During the intervening period the following conditions demand immediate operation: active septic process in a drained wound, evidence of cerebral irritation, compression of coma and slow pulse.

Jackson H. Cranio-pharyngeal Duct Tumors.

Jackson reports one case and refers to cases collected from the literature. The tumor arising from rests of embryonic tissue along the course of the cranio-pharyngeal duct.

These rests of buccal epithelium which may occur within the persistent canal and at the cranial extremity of this canal in the region of the infundibulum and anterior lobe of the hypophysis may give rise to cystic or solid tumor.

These hypophyseal duct tumors lie in the median line at the base of the brain bounded anteriorly by the optic chiasmus posteriorly by the pons above by the floor of the third ventricle and below by the sella. Laterally they may encroach on the cerebral peduncles and temporal lobes. The circle of Willis usually surrounds the tumor. The hypophysis itself may be found intact or be pressed against the floor of the sella. The first five cranial nerves may early undergo a pressure atrophy but the olfactory nerves usually escape. The foramen of Monro may be occluded and internal hydrocephalus may result. The optic tracts are most seriously affected and may be spread out on the tumor like a ribbon. The sella is usually normal in size or only slightly enlarged. The tumors are usually the size of a pigeon or hen's egg when discovered. The majority are cystic when solid they show areas of cystic degeneration. The author describes the histology in detail.

Of 17 cases in which the symptoms are clearly stated 12 were associated with adiposity and other symptoms of the Froelich syndrome such as genital dystrophy and loss of body hair. In 6 cases 19 had symptoms of falling vision and 15 of brain pressure. Optic atrophy was noted in 17 cases. The clinical course is varied some cases are acute

stige in three or four weeks, others have symptoms for years.

No case reported has been associated with acromegaly.

In regard to diagnosis, roentgenoscopy is usually negative because the sella is rarely enlarged. The early disturbance of vision and one or more symptoms of the Froelich syndrome, especially adiposity will suggest a tumor of the hypophyseal region. 70 per cent of these are craniopharyngeal duct tumors. The finding of cyst at operation with the microscopic demonstration of stratified epithelium of the buccal type completes the diagnosis.

If drainage of the cyst type can be maintained, the patient can live for an indefinite length of time. If the cyst continues to enlarge, blindness usually results from pressure on the optic tracts, and death follows in a few months or years from brain pressure. On the whole the outlook for this type of tumor is bad as it is practically impossible to separate the cyst wall from the surrounding brain structures.

Three operations were performed by Kanavel by the transphenoidal route, the nose being reflected upward. The anterior wall of the cyst was removed together with some blood-stained fluid. The patient is still living one and half years after the last operation, and there has been no return of symptoms to date. E. H. POOL.

Royce, C. E.: Sarcoma of the Base of the Skull. *J. Am. Med. Assn.*, 9 6, 1914, 183.

Reported cases of sarcoma of the bones of the base of the skull are not numerous. Of twenty sarcomas in this region, 60 per cent occupied the middle fossa. They rarely progress toward the brain but invade the bones and sometimes send processes into adjoining sinuses. Disturbances of the cranial nerves gradually appear due to growth about the nerve-roots. Sarcomata tend to involve one side only if bilateral they are almost always carcinoma or endothelioma. Exceptionally bilateral growths may be fibrosarcoma or very malignant sarcoma. The author quotes Cantanetti's case of sarcoma of the sphenoid and reports a case of his own. In the latter there had been complaint of headache and disturbance of vision, ophthalmic examination showing optic neuritis with exudate. Decompression revealed nothing but increased intra-cranial pressure. At necropsy an encapsulated mass 9 cm. in diameter was found intimately connected with the periosteum covering the sphenoid bone. Section showed cells of spindle-shaped type, mitotic figures not being numerous, and tumor cells everywhere separated by reticulum of connective tissue. E. K. ANDERSON.

Black, D.: Cerebellar Localization in the Light of Recent Research. *J. Lab. & Clin. Med.*, 9 6, 1, 467.

The author points out that the general theory of cerebellar localization as originally formulated by

Bolk has been to a large extent confirmed not alone by experimental studies but also by careful clinical observation. Barany's localizations in the human cerebellar cortex remain yet to be confirmed in detail but the importance of his work in thus presenting a possible means of early diagnosis of cerebellar disease cannot be overestimated. Black further points out the contrast in the phenomena of motor localization characteristic of the cerebrum with those of the cerebellum and notes the fundamental differences between cerebral and cerebellar control. The cerebellar cortex has been shown to be practically indestructible as compared with that of the cerebrum over the motor area.

He points out that muscular representation in the cerebral motor is chiefly determined by the segmental point of the respective muscles and, broadly speaking, more distal muscles are represented in the upper portion of the motor area while the most cephalic groups are represented in the lowermost areas of the precentral region. On the other hand in the cerebellum, while the grouping of the tonus extensors has been determined in part by segmental points, their arrangement within the lobules has been chiefly determined by the functional association of muscular groups.

The cortex of the cerebellum is everywhere concerned in the elaboration of fine, rhythmic, and static impulses of recurring nature distributed for the most part homolaterally. A special part only of the cerebral cortex is concerned in the elaboration of impulses of voluntary motor clonic nature distributed heterolaterally.

Destruction of the motor cortex on one side of the cerebrum gives rise to a total paralysis of spastic nature in the musculature of the opposite side of the body while destruction of the cortex on one side of the cerebellum causes no paralysis but gives rise to atonia, astasia, and ataxia of the musculature on the same side of the body. GEORGE E. BEHRER.

Amberg, E.: Conduction Anesthesia in a Case of Brain Abscess. *T. Am. Otol. Soc., Washington*, 9 6, 1917.

The patient, 37 years old, had been ill for about ten days with severe pain. He had had middle-ear suppuration on the left side for sixteen years. Various mental tests with pencil, watch, keys, etc., showed that he recognized the objects but could not name them, and a diagnosis was made of intracranial complication of a chronic middle-ear suppuration.

The patient was removed to the hospital and a radical mastoid operation was performed and masses of cholesteatomatous material removed. Pus led the way upward and backward, and a small opening of the skull above and behind the external ear canal exposed a fresh pinkish-colored pachymeningitis. The patient was not benefited by the operation, and several days later an extensive opening was made adjacent to the small upper opening, about 1.5 inches backward and about .5 to 1 inch wide, exposing also the lateral sinus. Introduction of the

brain knife through the area of pachymeningitis to a depth of 1 cm failed to reveal anything of importance. The patient did not improve.

Four days later the dura which did not pulsate was incised vertically about half an inch behind the area of pachymeningitis and a Jackson brain searcher introduced forward upward and inward liberating about six drams of pus. There was no pulsation, no colon bacilli were found.

Two days later the brain scar her was introduced backward liberating about three drams of pus. There was no brain pulsation and not much improvement.

Several days later the process was repeated, the brain-searcher being introduced deeper and more forward over one ounce of pus being liberated. The brain pulsated and the patient's condition was improved.

Three days later more pus was liberated. Pulsation was good. The brain searcher was directed to a point about 0.5 to 0.5 inch above the eyebrow in the middle of the forehead and introduced to a depth of about 1.5 to 2 inches. About one ounce of foul smelling pus with gas was evacuated. A rubber drainage tube was introduced and there was a constant discharge. Fresh dressings were applied daily, the rubber tube being reintroduced the length gradually being shortened for about five weeks when the brain wound had entirely healed.

The patient's perception and recollection seemed to improve throughout the course of treatment. When shown objects such as a nail file, collar button he could recognize them but was unable to name them readily. He could write better than he could read. He wrote rapidly but was unable to repeat the words he wrote.

NI-29-5 C. C. McClelland reports: Examination of fundus with H & C drops pupils dilated fully and equally in usual time. Left eye details of fundus easily seen. Nerve head indistinct on nasal side, more clearly defined on temporal side. Right fundus about same as left.

NI-0 Total leucocytes 9,000 polynuclear 88.4 per cent blood-culture negative

NI-3 White 14,032 polynuclear 9 per cent

NI-25 Total white 14,100 polynuclear 9 per cent

NI-26 Total white 13,240 polynuclear 5 per cent

NI-7 Total white 10,666 polynuclear 16 per cent

NI-9 Total white 11,000 polynuclear 71.3 per cent

NI-7 Total white 12,000 polynuclear 68.5 per cent

NI-3 Cells in spinal fluid 17.3 per cent mononuclears

When heard from three months later the patient stated that he felt very well but that he tired out quickly and that he sometimes had headaches and dull pain in his head when he worked too hard.

Cope, V. Z. The Pituitary Fossa and the Surgical Methods of Approaching It. *Lancet* Lond. 9/6/00

A pituitary body is present in all vertebrates but only in mammals is there a specialized protection afforded by the skeleton. In the human embryo

the fossa is formed at an early stage a recess being observable in an embryo of 25 mm. The current statement that the transpharyngeal anal lies between the pre- and post-sphenoid is incorrect. The canal traverses the anterior part of the post-sphenoid. Radiograms of the skulls of children show that there is normally great variation in size and that there is no particular age at which peculiar increase in size occurs.

The size of the pituitary body is usually 11 mm long and 11 mm wide. The sella is lined by dura mater which is continuous with the diaphragma sellae so that the gland is hemmed in by a cuboidal box three sides of which are bone and three sides fibrous. The phenoidal sinus enlarges somewhere between the seven and the fourteenth year until the whole of the pre-sphenoidal area is excavated at which point the excavation may stop but it commonly proceeds back into the basopharynx. In the former type the pituitary body causes no bulge into the sinus while in the latter phenoidal type the bulge is always present.

The fossa is surrounded by a bony rim mounted by an arterial circle (Horsley & Willis). The venous circle is formed by the internal carotid and the anterior and posterior intercavernous sinuses. A pituitary growth ascending from the fossa enters the arterial circle pushing up the optic chiasma until the optic nerves are gradually strangled between the neoplasia and the arteries.

Abnormal tissue may be laid down, enlarged, reduced and deformed. Enlarged sella may be due to adenomatous overgrowth of the anterior part of the gland to malignant neoplasia originating in the fossa, possibly to repeated physiological enlargement due to increased functional activity and more rarely to a general or local hydrocephalus, chronic circumscribed meningitis or to tumors of other parts of the brain. Very small fossae are seen in cases of hypopituitarism associated with imperfect development of the gland. The fossa may be deformed by tumors butting from within or by interpeduncular neoplasms pressing down from above. In the former the nature of the deformity would depend upon the rate of growth producing a thinning, a cup-shaped outline or bony rim or all traces of the original shape. If the dorsum sellae or anterior or posterior clinoid processes are obliterated or markedly eroded, there must be a large intracranial extension to the tumor.

The pituitary fossa has been arrived at either directly through the cranium or indirectly through the facial skeleton the following table showing the routes which may be utilized.

CRANIAL

Temporal —

Intradural (Horsley)

Extradural —

Extradural (Braun)

Frontal (Krause)

Fronto-orbital (Frazier)

Callosal puncture

FACIAL

Nasal —

Septal resection (Schloffer, Hirsch)
West, Cushing, Kanavel,
Halstead, etc.)

Nasal —

Ethmoid resection (Hirsch)
Paranasal (Chiari, Kahler)
Palatal (Koenig Freytag)
Maxillary
Suprathyroid pharyngotomy

Of these operations only four have been done in sufficiently large number of cases to merit special attention.

Horsley's temporal method is done in two stages. A temporal bone-flap is made in the first stage, and in the second, the dura is incised and the temporal lobe lifted up exposing the lateral aspect of the pituitary body. In Schloffer's method approach is gained to the nasal cavity either directly through the anterior nares or by reflecting the nose, or by sublabial incision. Varying portions of the septum and lateral walls of the nasal fossa are removed to furnish more room; the sphenoidal sinus is opened and through it the pituitary fossa is approached. Hirsch and Cushing do a most ingenious subnasal septal approach, Cushing removing the vomer part of the median plate of the ethmoid, and a strip of septum. The attachment of the septum to the sphenoid being exposed, the anterior and lower walls of the sinuses are chipped away and the floor of the exposed sella turcica removed. Hirsch removes the middle turbinates some days before the chief operation. The fronto-orbital method of Frazer is begun by forming an osteoplastic flap in the frontal region; the roof of the orbit is removed as far back as the optic foramen; the orbital contents are displaced downward and outward; the frontal lobe is elevated and the dura incised for a sufficient length to expose the contents of the sella. Other operations have rarely been performed.

The nasal route of Schloffer is fundamentally unsound, as are all of its modifications, excepting the subnasal as the sella is approached through a region teeming with organisms or harboring foci of infection in adjacent sinuses. Considerable deformity of the external nose may follow also. The same objections hold against the palatal method which traverses the septic post-nasal space and also against the Chiari-Kahler approach through the ethmoid by external incision. Though Kahler has had some success with it it is too early to say much in its favor. The temporal method has been found practicable by one operator only but with a considerable mortality.

The only justifiable method of approach through the sphenoidal sinuses is that of Cushing or Hirsch, especially that of Cushing. Of 35 operations performed by the sublabial method by the latter operator but one death occurred. With this method special skill in working in such confined space is necessary as the surgeon cannot see what relationship his inserted spoon bears to the third ventricle. On several occasions it has been necessary to insert a metal clip for radiographic orientation purposes. A preliminary sounding of the sphenoidal sinuses is wise before undertaking this operation.

Facts in favor of the fronto-orbital method are that it provides an aseptic route, allows each step to be performed by the aid of sight and does not necessitate much dislocation of the brain as with the temporal method.

The most common indication for operation is oncoming blindness and it seems certain that in nearly all these cases there must be considerable intra-cranial extension. With the fronto-orbital method these enlarged glands present an easier object for attack. Some edema of the eye occurs after operation and sometimes the eyeball may not be left quite on the same level as the opposite one. The latter drawback should be avoided by greater care at the time of operation. The frontal sinus is sometimes in the way but by previous X-ray or transillumination it can be avoided.

While it is not possible to say which of the Hirsch-Cushing fronto-orbital methods is to be preferred, the author believes that the latter is more suitable in the majority of cases.

E. K. AMESBURY.

NECK

Wason, L. F. Quinine and Urea Injections in Hyperthyroidism. *V F M J* 916, 681, 79

The author briefly reviews some of the methods of recent years that have been instituted with the idea of controlling the hyperactivity of the thyroid gland. He emphasizes the necessity of rest, with proper dietetic and hygienic supervision as the foundation for any procedure in the treatment of hyperthyroidism and urges that the other ductless glands as well as the thyroid in each patient be studied; their rôle in contributing to the symptoms ascertained and treated accordingly.

The author recommends quinine and urea injections to relieve hyperthyroidism only and not to remove the goiter; however small, recent goiters usually disappear following the treatment. Much depends upon proper selection of cases. The technique is difficult and the method is suitable for use only in a hospital by men experienced in thyroid surgery.

The author describes an original method of raising the hyperthyroid patient's threshold to stimuli, by means of preliminary injections into the thyroid gland of a few minims of a sterile salt solution, followed by injections of sterile water given at one- to three-day intervals. When no hyperthyroid reaction follows the water injections their usefulness is at an end. If these preliminary injections are omitted, acute attacks of hyperthyroidism which might result disastrously are liable to

follow. It is important that the slight pain of the injection be minimized by the use of local anesthesia. It is important that the patient does not come to dread the injections because the best results are secured through prolonged periods of treatment.

E. H. POOL.

Marsh M. C. and Von Willer P. Thyroid Tumor in the Sea Bass (*Serranus*) *J. Cancer Research* 9: 6 1935.

The authors' contribution to the pathology of enlargements of the thyroid in fish is based upon five cases of thyroid enlargement observed in *serranus* (sea bass). The authors state that although thyroid tumors have long been known to occur in fish they have not been observed until recently outside the salmonoid group and only rarely outside of domesticated fish where they are endemic and widespread.

The only case known to have occurred in fish from marine waters besides the present specimens is the case described by Cameron and Vincent. This was in a small shark of the genus *squalus* of the Pacific coast of North America.

The authors report that of the five tumors one specimen was plainly colloid goiter, one was microscopically a step in advance toward epithelial increase of large alveolar type and shrinkage of the colloid content. In another the epithelial outgrowth was predominant over the colloid, the cells having become high columnar and the growth having taken on a definite adenomatous structure. In one case marked regression was indicated.

The growth in these specimens of *serranus* is not regarded as giving pronounced evidence of malignancy. Little infiltration is exhibited throughout the growth as a whole. In this respect the growths do not approach the process as exemplified in the fresh water salmonoids or in the case of *squalus*. The bodies of the fish were not examined for metastases. The authors believe the tumors to be true neoplasms representing early stages of processes which are of essentially the same nature as the other thyroid overgrowths in fish which have been the subject of investigation.

The authors call attention to the fact that iodine acting through the water medium even in great dilution has a marked action upon thyroid hyperplasia or more advanced overgrowth in fresh water fish, reducing the heightened epithelium, restoring colloid and effecting regressive changes in general. They claim that their specimens are of additional importance from the fact that the fish were removed from the sea to an aquarium supplied with sea water and were habitually fed with marine fish, chiefly the pilchard (*Diplodus pilchardus*). They received no mammalian tissues. They acquired the growths in sea water which contains a far greater concentration of iodine than that which is effective in reducing thyroid hyperplasia in fresh water fish.

E. H. POOL.

Gaylor H. R.: Further Observations on So-called Carcinoma of the Thyroid in Fish. *J. Cancer Research* 1916 1917.

The author reviews the literature of the so-called carcinoma of the thyroid in the salmonids.

The disease was first described by Bonnet in 1883. Although this author did not recognize its nature, Scott in 1901 regarded it as cancer and Plehn in 1902 recognized it as a neoplasm of the thyroid gland. In the same year it was described by Gilruth as epithelioma affecting the branchial arches. A comprehensive histological study based on some ten specimens of fish was made by Lick in 1905. The author's contributions to this subject date from 1908 with the description of conditions existing in a hatchery in which hundreds of fish were affected. The disease has been studied also by Marine and Lenhart beginning in 1900 and they consider it to be endemic goiter. Gaylor's studies were published in monograph form in 1914 and led to the conclusions regarding the nature, distribution and significance of the disease which are summarized in this article. Gaylor emphasizes the fact that the disease is endemic in a very high percentage of all trout hatcheries in the United States. He states that the occurrence of the disease in wild fish, its production in fish cultural stations, its localization in certain troughs of water supplies, the method of its spread, its transmission to mammals, the efficacy of three well known inorganic germicides in the treatment of the disease, the destruction of the agent by boiling and the phenomena of spontaneous recovery and immunity strongly indicate that the agent causing the disease is a living organism.

Gaylor states that as there is no line of demarcation between what is called endemic goiter and what may be considered as cancer of the thyroid, endemic goiter and carcinoma of the thyroid in the salmonoid are identical.

The cases found in sea bass by Marsh and von Willer, the thyroid tumor found in *squalus* or small shark by Cameron and Vincent together with the evidence which has been collected regarding the existence of thyroid carcinoma in fish living under natural conditions, and hence unaffected by overfeeding, overcrowding etc., strengthen the conclusion that the disease is not the result of artificial propagation. The occurrence of the disease in sea fish bears rather strongly upon that theory of thyroid hyperplasia which attributes it to a deficiency of iodine in the food or environment. In fact so far as fish are concerned the similar results obtained with mercury and arsenic would seem to show conclusively that iodine acts in a manner similar to the metals, and not by supplying a deficiency of iodine in the gland.

The observation that mercury, arsenic, and iodine when introduced even in small amounts into the water containing fish with thyroid tumors bring about a marked diminution in the size of the neoplasm, develops increased significance in the light of recent experiments reported by McCarrison.

In discussing the question whether the iodine acted as a purifier of the water especially as germicide or whether its effect was to be attributed to its supposed physiological influence upon the thyroid gland, McCarrison stated that he had obtained equally favorable results in the treatment of goiter with thymol; hence he was not inclined to attribute to iodine a distinctly physiological action in the treatment of goiter.

McCarrison's experiments do not show conclusively that iodine worked by destroying an agent in the water supply for the possibility still remains that it may have exerted some germicidal effect in the individual drinking the water. It is to be regretted, therefore, that he did not entirely substitute chlorination of the water for treatment with iodine. E. H. POOL.

Littl, E. G. Scleroderma Associated with Graves Disease, and Later Myxodema, Conspicuously Benefited by Implantation of Human Thyroid into the Bone-Marrow. *Proc. Roy. Soc. Med. 9 6 12 Dermal Sect. 69*

The case is described of a lady aged 51 who in 1900 presented the symptoms of Graves disease to a mild extent. In 1908 she developed myxodema. Her pulse rate, however, still continued to be 80 and her blood indicated marked anemia. Periods of irregular fever with urticarial swellings as well as pains in the shoulder and neck bothered her so much that she had to be carried in a chair. The scleroderma became evident in 1910 affecting chiefly the fingers, forearm, face and thighs. The stiffness became so extensive that she was greatly crippled. The mental accompaniments of myxodema, dullness and lethargy were conspicuously absent.

Implantation of thyroid was made into the tibia in 1912. Following this the scleroderma was much improved. She was taking sodium thyroxine at this time. In 1913 a second implantation of thyroid tissue was made. In 1913 pyorrhea alveolaris was diagnosed. After having all her teeth removed, there followed a remarkable change in her general health and appearance an improvement which has been steadily maintained. At present the fingers have become flexible enough to permit her to play the piano. The skin of the face is supple and otherwise normal. H. G. SLOAN.

Gronnerud, P. The Technique of the Enucleation Thyroidectomy. *Illnesses of J. 9 6 2212 59*

This operation will be found practically applicable to all parenchymatous goiters, whether of the cystic, colloid, fibrous, or mixed variety but should never be attempted under the vascular or active hyperplastic enlargements. It is a method very largely eliminating the use of clamps and accompanied by minimum loss of blood, never followed by nerve complications and when even mediocre surgical

judgment is available, of extreme breadth in application.

The usual low skin incision is made. The fascia is raised slightly and cut parallel to the contained veins and the cleavage line between the revealed edges of the sternothyroid and sternohyoid muscles observed. These muscles are separated and retracted, revealing the encapsulating fascia of the gland. It will thereupon appear that the true capsule of this organ blends with the so-called Kocher fascia and is very rich in arteries and veins. When the anterior fascia, which is comparatively free from large vessels, is opened the thyroid capsule will be seen. No clamps are used in these procedures, hemorrhage so far being slight and automatically ceasing on the correct separation of the tissue layers. The true capsule is then opened laterally, and, by posterior pressure, the tumor delivered. The tumor may be eviscerated without difficulty leaving a comparatively bloodless bed which depicts the arrangement of vessels in the true capsule.

In 98 thyroidectomies in which the above technique was followed the application of clamps to the inferior thyroid artery was necessary in two cases, but being inside the capsule no injury to the nerve was possible. Necessity for clamping the superior thyroid artery did not arise. EDWARD L. CORNWELL.

Purwen, W. J. and J. W. and Eggstein, A. A. Serum Changes Following Thyroparathyroidectomy. *J. Exp. Med. 9 6 1000, 499.*

The experiments here recorded were made on dogs. Thyroparathyroidectomy was performed in fifteen animals, and the serum changes were studied. The following two experiments were typical of the relations noted.

On the first dog weighing 5 kilos complete thyroparathyroidectomy was performed June 9 5. Tetany was observed on the third day following the operation. On the fourth day the dog showed no symptoms but on the next day (June 5) there was marked tetany. The animal was found dead the following morning.

On the second dog weighing 8 kilos complete thyroparathyroidectomy was performed June 8 915. Tetany was noted on the afternoon of June 10th again on the following afternoon, and the next morning (June 11) when the animal was killed.

In the first dog there was a gradual increase in the antiferment titer until the time of death with an irregular protease curve. The maximum protease activity was noted in the animal during the time when the tetany was most apparent. The non-coagulable nitrogen of the serum increased to more than twice the original amount. The lipase remained constantly low. The proteases increased markedly. The amino-nitrogen of the serum in this animal showed no change except an initial decrease.

In the second experiment the conditions were different. The antiferment titer showed marked fluctuation the first decline appearing shortly after the operation. The protease remained low

until the last day but the non-coagulable nitrogen increased as in the previous animal the proteoses also accumulated during the period of tetany. The increase in amino-acids was similar to that observed in practically all the other animals during tetany. This was the only animal of the entire series in which a rise in the lipase titer was observed.

From their study the authors draw the following conclusions:

1. In thyroparathyroidectomized dogs the onset

set of tetany bore no constant relation to the permanent antiferment balance of the serum.

2. The serum lipase titer remained at a low level throughout.

3. A progressive increase in non-coagulable nitrogen and proteoses was observed in the serum following the removal of the glands.

4. The amino-nitrogen of the serum was usually increased at the time when tetany was most marked.

(CLARK & E. BELL)

SURGERY OF THE CHEST

CHEST WALL AND BREAST

Menzies, J. L.: Notes on a Series of Seventy-five Gunshot Wounds of the Chest. *Brit. J. Surg.* 9: 611, 1916.

The statistics of a series of 75 cases of gunshot wounds of the chest are reported by the author, and 12 of the more interesting cases are described in detail.

The most notable feature of the series is the rapid recovery where there was no destruction of the chest wall as compared to the high mortality in cases with open wounds. Where the pleural cavity communicated with the outer air the results were almost uniformly fatal.

The symptoms are pain, shock, dyspnea, and hæmoptysis and are due to damaged lung tissue and the resulting escape of blood and air into the pleural cavity. Pain is always present but is rarely severe. On the other hand shock is usually pronounced. Dyspnea is almost always present and is most severe immediately following the wound abating within twelve to twenty-four hours.

Hæmoptysis occurs in the majority of cases, seldom, however, being severe and lasting only two or three days. In the series 2 had no bleeding in 40 it came on immediately after injury and in 8 it was delayed from one to twelve hours. In all cases there was a rise of temperature.

In the base hospital dyspnea and pyrexia are the prominent symptoms depending on the presence of an effusion and whether it is sterile or septic, the amount of effusion determining the degree of dyspnea. In the series effusion took place in 70, 40 were sterile, 10 showed slight infection and 11 marked infection.

Pneumothorax was present in 14 of the cases, in 8 it communicated with the outer air. Surgical emphysema was present in 12 and required no treatment. Twenty-seven cases were discharged as cured with the missile retained but causing no symptoms.

The cases were divided into those with wounds which were healing or healed and those with wounds opening into the pleural cavity at admission. There were 6 cases in the first class and 8 in the second. Those of the first class were much more

favorable for treatment. 66 recovered and 1 died of sepsis. The majority of effusions were bacteriologically sterile.

In the second class the results marked destruction of the chest wall, all were infected (pyohæmopneumothorax) and the mortality was very high. Of 8 cases 7 died. Autopsies show that the invasion of the lung with lung abscesses preceding from the track of the bullet.

In the entire series 6 recovered and 5 died, the deaths being due to sepsis.

In the treatment rest is a paramount morphus being used as a sedative.

When the effusion is sufficient to breathe it may or may not be removed depending upon the case. If left alone recovery is prolonged.

If the effusion is infected early drainage is indicated, resection of a portion of a rib with a large drainage tube giving the best results. With a large empyema cavity the prognosis is grave.

Early rising with general and breathing exercises was found most beneficial.

(P. M. CLARK)

Newbolt, G. P.: Clinical Lecture on Cancer of the Breast. *Med. Press & C.* 316.

In the author's opinion three reasons still militate against cancer of the breast: (1) bad advice of the family physician, (2) failure of the patients to report the presence of the tumor, (3) disinclination on the part of the patients to have the radical operation done. Another factor which influences the laity to believe that the tumor is not cancer is the fact that it is not painful.

The author lays stress on the fact that the nipple need not necessarily be retracted in cancer of the breast. He thinks that where the supraclavicular glands are involved the outlook is extremely grave, and the prospect for cure quite remote. The prognosis usually depends upon the stage of the growth at which removal is undertaken as well as the age of the patient. The prognosis in young and healthy persons is bad. The best results are in women over 50. In males the outlook is extremely poor. Attention is called to the frequency with which metastasis occurs in the opposite breast, sternum, spine, and hip.

(H. G. SLOAN)

Gatewood. Tuberculosis of the Mammary Gland. *J. Amer. Med. Ass.* 9 6 xiii, 72.

The author credits Astley Cooper with having described the condition in 1829. Dugar in 88 first described the disease microscopically. Deaver collected 94 cases which were reported between 19 4 and 9 5 and Durante collected 150 cases in 9 4.

Tuberculosis of the breast has been classified into primary and secondary groups. The primary group comprising only those cases in which the disease was limited clinically to the breast and the glands of the axilla. In that class there are no post mortem has been made in which the condition was so localized. Gatewood is of the opinion that all cases of tuberculosis of the breast are but secondary manifestations of tuberculosis elsewhere.

In the majority of cases the bacillus reaches the breast through lymph channels, probably retrograde embolic process. The disease usually occurs in the female breast. No cases have been observed before puberty cases usually occurring between the ages of 3 and 50. The most frequent initial lesion is a painless lump in the breast. Any patient presenting a lump in the breast and complaining of pain in the region of the tumor on deep inspiration should be radiographed for tuberculosis of the ribs.

The progress of the disease is usually rapid. One breast is involved as a rule. The lymph-nodes are enlarged in from 60 to 70 per cent of the cases.

Fistulae, retraction of the nipple, and enlarged lymph-glands on the affected side are the most constant physical findings of the disease. The majority of the cases present tumors they may be discrete, disseminated, or become confluent. The consistency varies with the amount of liquefaction and caseation. The skin becomes adherent to the mass and assumes a dark red appearance. This is followed by a rupture, discharge of caseous material and sinus formation.

Tuberculosis of the breast must be differentiated from syphilis and actinomycosis. Potassium iodide is almost specific for both.

The treatment of tubercular mastitis is surgical. The after-care is important. The use of boric acid is of questionable value. **IMMOBILIZATION**

Robinson, S. Treatment of Chronic Non tuberculous Empyema. *Surg. Gynec. & Obst.* 9 6 xiii, 557.

Three types of cases are mentioned: (1) those with an operative drainage wound; (2) those with leakage through a *necessitatis* opening; (3) those with bronchial drainage. Several types of cavities are described and illustrated: lateral cavities, small and large, anterior cavities, posterior cavities, cavities in the upper thoracic segment, multiple cavities designated as generally fatal. A preliminary drainage operation regardless of previous openings is imperative at least six weeks previous to any operation for cavity obliteration. Operations for

obliteration should be without mortality. The Estlander-Schede, Wilms-Delorme-Fowler, and Sudek methods all possess advantages and also sources of error.

Muscle implantation may be employed in cavities of moderate size utilizing the latissimus dorsi muscle dissected from the Schede U-shaped flap. The operation is preferable to those requiring partial resection of the scapula, described by Sudek and others, the latter producing limitation of shoulder motion.

Another operation is described involving the infolding of lateral skin and muscle flaps with exposure of the entire cavity for subsequent skin grafting or suture granulations and epithelialization. Surgical success depends upon the choice of a single method or a combination of methods applied with accurate knowledge of the extent and location of the cavity and with conservatism in the number of operative stages. The non-operative treatment of chronic empyema such as vaccine therapy and antiseptic injections, produce symptomatic relief and a diminution in the discharge but the relief is more apparent than real. These treatments are frequently misapplied and generally serve unnecessarily to postpone obviously indicated surgical therapy. Bismuth and vaseline injections (Beck) possess no definite curative value in cavities primarily small or reduced to suitable dimensions by paracentesis.

Ewing, J. The Thymus and Its Tumors; Report of Three Cases of Thymoma. *Surg. Gynec. & Obst.* 9 6 xiii, 46.

The thymus reticulum is composed of modified epithelial cells, while the parenchyma cells are lymphocytes which have wandered into the stroma from without. The evidence indicating the derivation of thymus parenchyma cells from the epithelial stroma is unsatisfactory.

General pathological conditions affecting the thymus include aberrancy of thymus tissue in thyroid, simple hyperplasia in status lymphaticus, Graves disease, and simple lymphadenoma, exfoliation of reticulic cells in leukemia and infectious cysts and neoplasms. Cysts arise from persistent embryonic epithelial canals, from branchial and ventral ectoderm, from distended softened Hassall's corpuscles and from lymphangiomata.

Neoplasms include round-cell growths, commonly classified as lymphosarcoma and tumors composed of flat or cylindrical epithelium. There are rare myxosarcomata of congenital origin, but malignant tumors arising from the connective tissue probably do not occur.

The so-called round-cell tumors, properly called thymomata, are derived from the epithelial stroma cells, and may be distinguished from true lymphocytomata of lymph nodes. The cells are not round lymphocytes but polyhedral or cylindrical, or giant derivatives of the stroma cells. The same variations in structure are observed as in Hodgkin's

granuloma and reticulum-cell sarcoma of lymph nodes. The clinical course of these tumors also varies from the character of a progressive granuloma to that of a highly malignant locally aggressive neoplasm which may produce widespread extensions and metastases. A notable feature is perforation of the chest wall. The anatomical position and peculiar structure usually permits a satisfactory diagnosis. Thymic carcinoma includes those tumors composed of pavement, cubical or cylindrical epithelium, but there is no sharp dividing line between the two groups and both arise from the reticulum cells. The parallel existing between thymic granuloma and thymoma on the one hand and lymphatic Hodgkin's disease and reticulum-cell sarcoma on the other suggests that in both organs an infectious agent initiates an infectious process which often runs into a neoplasm. Most reported cases of the transformation of Hodgkin's disease into sarcoma relate to mediastinal and probably thymic tumors.

The reported cases include a rapidly progressive febrile case with very extensive invasion of the neck, chest and axilla by a tumor of diffuse structure, a perforating sternal tumor of two years' progress structurally resembling Hodgkin's granuloma, regressing under X-ray and a slowly progressive thymoma of granulomatous type limited to the mediastinum and showing polyhedral reticulum cells and Hassall's corpuscles.

TRACHEA AND LUNGS

Moore A. B. and Carman, R. D. Radiographic Diagnosis of Metastatic Pulmonary Malignancy. *Am. J. Roentgenol.* 1916 11: 116

The authors give a report based on 71 positive cases examined at the Mayo Clinic by both clinical and radiographic methods.

LOCATION OF PRIMARY FOCUS IN CASES SHOWING RADIOGRAPHIC EVIDENCE OF METASTASES IN THE LUNGS

	% Cases
Total number tabulated	71
Breast	20
Thyroid	8
Kidney	5
Soft tissues of forearm and shoulder	6
Soft tissues of leg and thigh	6
Soft tissues of neck and face	5
Uterus	2
Esophagus	2
Prostate	2
Testicle	2
Hard palate	1
Larynx	1
Sigmoid	1
Adrenal	1
Lung	1
Abdominal and pelvic masses	4
Origin not determined	4

Men	32
Women	39
Average age	45 5 years
Average time since growth was noticed	2 25 years
Histologic examination	59 cases
Carcinoma	40 cases
Sarcoma	16 cases
Hypernephroma	3 cases
Enlargement of superficial glands	35 cases
Enlargement of deep glands	8 cases
Other foci of metastasis	14 cases

Apparently no idea as to the presence of pulmonary metastasis can be gained from the extent of the primary growth. Many cases with extensive involvement showed no metastasis while in many the primary growth was small and clearly operable except for the radiologic evidence of metastasis.

Fourteen of these cases showed metastasis in organs other than the lungs or lymph nodes. The other organs most frequently involved were the liver, bones and brain.

Of the patients operated on 42 had been subjected to surgical procedure for the removal of the primary growth of these 10 showed local recurrence. The average time from the operation to the discovery of the metastasis was 15 months.

Cough was present in 32 cases. It was usually dry hacking and unproductive expectoration having been noted in but 8 cases. Only 3 gave any history of blood spitting. The so-called prune juice sputum, regarded by some observers as indicative of this condition was not observed.

Dyspnea occurred in 30 cases. It was usually progressive and, when marked, tended to be spasmodic in character quite often simulating asthma.

Pain referred to the thorax was noted in 14 instances, usually described as gnawing and not influenced by respiration.

There was both clinical and radiographic evidence of pleural effusion in 12 of the cases.

A very striking feature was the relative absence of definite physical findings.

The conclusions are:

1. Pulmonary metastatic malignancy is not an uncommon condition and may occur regardless of the seat of primary focus.

2. Pulmonary metastasis bears no relationship to the extent or duration of the primary focus.

3. The clinical picture in a majority of these cases is very indefinite neither the subjective nor the objective manifestations being characteristic.

4. Metastatic pulmonary malignancy is a definite roentgenographic entity appearing in the roentgenogram as clear-cut circumscribed areas of increased density.

5. In many instances the diagnosis can be established only by the roentgenogram. By routine roentgenographic examination of the thorax many patients suffering from malignancy will be saved from useless and unwarranted surgery.

DAVID R. BOWEN

PHARYNX AND ESOPHAGUS

Hirsch, I. S. The Roentgen Ray Study of the Esophagus. *Intern. M. J.* 9 6 xiii, 42

Hirsch's paper is comprehensive. For a contrast mixture he uses a tablespoonful of bismuth subnitrate (subnitrat) stirred for about ten minutes with a teaspoonful of m. dilage of acids. The resulting mass is viscous and by coating the walls of the esophagus outlines its lumen. The examination is essentially fluoroscopic but plates are also made. The oblique view either of noventral or ventrodorsal, is emphasized. Two periods in the act of swallowing the buccopharyngeal and the esophagogastric may be differentiated. The bolus is propelled by the pharynx into the esophagus with great force and rapidity. It is carried through the esophagus by peristalsis. Solid food is carried down solely by peristalsis, while liquids are ejected from the pharyngo-esophageal junction (int. ostium) to the cardia. The wave is deepest in the lower esophagus where it is necessary to overcome the sphincter action at the cardia.

Foreign bodies are most frequently impacted at four points opposite the cricoid cartilage above the arch of the aorta, at the crossing of the left bronchus and at the diaphragm.

Two great classes of spasm may be differentiated the primary so-called idiopathic spasm, the etiology of which is not clearly understood and the secondary spasm, the reflex of irritation inflammation or laceration. The former affects the lower end of the gullet and leads to dilatation the secondary spasm may involve any part of the lumen. Spasm is indicated by the arrest of the bismuth in a cone-shaped shadow at the constricted point. In the primary cases with dilatation there may be rapid deep peristaltic waves moving to the base with occasional regurgitation. The outline is smooth and symmetrical above the point of obstruction.

Benign or scar stenosis is usually asymmetrically situated, while the extent of the stenotic area is short. Stenosis due to corrosives is most frequently found either at the pharyngeal mouth or in the upper dorsal part of the tube.

The commonest form of stenosis is that due to carcinoma. At least 70 per cent of patients complaining of dysphagia have this disease of the gullet. As a rule these tumors involve but a part of the surface of the tube rarely do they involve its entire circumference. This account for the irregular asymmetrical filling defect. Dilatation above it is never marked. Peristalsis is absent over the invaded area and distal to it.

Syphilis of the esophagus resembles cancer roentgenologically excepting in regard to the multiplicity of the lesions.

Diverticula are of two varieties, pulsion and traction. The former are most common are situated high, near the Introitus and appear as pouch-like adjuncts to the esophageal lumen.

ALBERT MILLER.

Moore, J. The Removal of Foreign Bodies from the Esophagus and Bronchi; with a Description of Some New Instruments. *Lancet*, Lond., 9 6 Oct. 99

The author has designed a new non-slippping forceps for removing foreign bodies of any description. The blades are shaped on the principle of crab claws the upper blade being curved and having at its extremity a triangle tooth which fits between two similar ones in the lower blade. Both blades are transversely serrated giving greater security to their hold on a foreign body. They are in addition grooved down the center so as to prevent any lateral slipping. He has also devised an endoscopic cutting forceps or shears which combines both the grasping action of forceps and the cutting action of shears.

OTTO AL. ROTT

SURGERY OF THE ABDOMEN

ABDOMINAL WALL AND PERITONEUM

Sampson, H. H. Clinical Notes on Penetrating Wounds of the Abdomen. *Brit. M. J.* 9 6 1, 547

The extent of the visceral injury caused by rifle bullet in the abdomen depends to a large extent on the distance the bullet has traveled before the impact. The most extensive wounds are caused when the range is less than five hundred yards.

The importance of primary hemorrhage lies in the fact that there is little tendency toward spontaneous arrest. When seen three or four hours after the receipt of the injury small arteries in the wounded bowel are still spurting vigorously. In fatal cases death is almost invariably due to primary hemorrhage. It becomes obvious, therefore

that on this account also, every effort should be made to convey the abdominal wounds with the least possible delay to a place which is equipped for operative treatment.

One case is reported in which a bullet traversed the peritoneal cavity in an area occupied by intestines without causing perforation of the viscera with which it must have come in contact.

Wounds of the small intestine are generally multiple but are usually confined to one segment of the bowel. Wounds of the colon are often complicated by injuries to other viscera. These cases show a high mortality. If however the injury is confined to the colon, the outlook is more hopeful, provided operation is performed before a widespread peritoneal infection has occurred.

Wounds of the stomach bleed freely but if un complicated respond well to operative treatment. Wounds of the liver give the best results. In simple perforations hemorrhage is slight bile drains away for a few days recovery is the rule.

The spleen is seldom injured alone. Its injury is often associated with that of the left kidney, pleura and lung.

J. H. SKILES

Fraser, J. and Bates, H. T. Penetrating Wounds of the Abdomen. *B. I. M. J.* 9, 6, 509

The authors report the operative results in penetrating wounds of the abdomen and discuss their observations in these cases.

In wounds of the stomach the degree of damage depends on the nature of the projectile and the part of the stomach injured. Shell fragments produce the most extensive destruction while bullets generally behave as in other soft tissues, i.e. small entrance wound and larger exit wound. Bullet wounds of the center of the stomach produce the least destruction; those of the pylorus quite extensive laceration while those of the greater or lesser curvatures are accompanied by widespread splitting and tearing of the tissues. Hemorrhage is not severe unless one of the larger vessels is ruptured.

Clinically this class of cases shows pain, sickness, collapse, abdominal rigidity and tenderness, the sickness being more pronounced than is usual and the collapse less marked. The pulse and respiration rates are increased, the latter proportionately more rapidly than the former. Pain is more pronounced when the pyloric or cardiac ends are involved and collapse more marked in wounds of the curvatures.

In the operative treatment the authors employ a left rectus incision, occasionally enlarging it laterally. When the situation of the wound is doubtful an incision parallel to the left costal margin is used. After rigid inspection one of three lines of treatment is instituted: (1) simple suture, (2) gastro-enterostomy or (3) pylorotomy with partial resection depending on the conditions found.

Six illustrative cases are described, 3 of which died, 2 recovered and one was unoperated. Suture was used in 3 cases, gastro-enterostomy in one, and resection in one.

Bomb fragments wounding the small intestine cause small multiple wounds with invaginated edges and a marked tendency to surrounding hemorrhage. Bullets traveling at high velocity cause small equally sized perforations at low velocity they cause considerable destruction of tissue. Wounds by shell fragments are usually quite extensive. Wounds of the free edge of the gut involve more tissue destruction than those of the fixed or mesenteric border.

Bleeding from the small intestine is usually severe especially in the jejunum and mesenteric hemorrhage is always progressive. It was also observed that the less the damage to the gut the

more likelihood there was of extensive peritoneal soiling. Massive injuries inhibit peristalsis.

Bullet wounds of the buttocks, it is noted are liable to be followed by evidences of injury to abdominal viscera.

Clinically these cases show signs of beginning peritonitis coupled with those of hemorrhage, the symptoms of bleeding coming on at first followed by those of peritonitis. The abdominal rigidity when bleeding is profuse often disappears.

The author advocates the routine incision and a complete inspection of the entire small gut before deciding upon the best method of procedure. The various methods are: (1) simple suture, (2) resection followed by lateral end-to-end anastomosis, (3) resection and temporary enterostomy.

With simple suture it was found essential that the wound be small, edges undamaged and mesentery intact. Wounds by bomb fragments are ideal for suture. The wound edges are not excised and linen thread was used.

The indications for resection and anastomosis are: numerous perforations, extensive size and degree of injuries and involvement of related mesentery. This procedure is highly favored by the authors. They also prefer the lateral anastomosis as being less likely to be followed by paresis and distention of the proximal segment.

Resection and enterostomy are only indicated as an emergency measure in rapidly developing collapse during operation.

A synopsis is given of 21 illustrative cases, 7 died, 14 recovered and 1 was unoperated. Suture was done in 5, resection in 13 and enterostomy in one.

In wounds of the colon the effects of the different projectiles are similar to those in the small gut with the exception that the septic material is much more likely to be walled off by adhesions. Peritonitis from such wounds however is intensely virulent.

Clinically the symptoms are likewise similar to those of wounds of the small intestine except in not being so widespread and with an absence of early sickness or nausea.

In the treatment if the case comes to hand later than twenty-four hours enlargement of the original wound and drainage is the best plan on the possibility that the infection is becoming localized earlier it is wisest to open the abdomen through a separate incision. The methods best adapted to this class of wounds are simple suture and simple suture with colotomy, resection not being deemed advisable. Drainage of the retrocolic space is always recommended.

A synopsis of 12 illustrative cases is given, 7 died and 5 recovered.

In wounds of the spleen the presence of free fluid in the abdomen, evidences of hemorrhage and the exit and entrance wounds diagnose the condition.

Splenectomy is usually indicated.

Two cases are reported with one death and one recovery.

Wounds of the liver, gall bladder and ducts are usually complicated by damage to the overlying lung or pleura. It is not usual to have much destruction or disruption of tissue in wounds of the liver and post-traumatic jaundice is uncommon.

The clinical symptoms may be remarkably absent, the lung symptoms frequently disguising the abdominal condition. Abdominal rigidity, increase of pulse, and temperature and pain over the liver were observed.

Cases showing progressive hemorrhage or complications of other viscera only were operated.

A synopsis is given of 14 cases all of which recovered.

In kidney wounds, extensive organic disintegration may occur with merely slight wounds. Hematuria may or may not occur in severe injury the kidney pelvis is usually blocked by a blood-clot.

Treatment consists in (1) simple drainage (2) kidney suture, and (3) nephrectomy.

Three cases are reported, all of which recovered, simple drainage being used in two and nephrectomy in one.

In wounds of the bladder it was observed that intraperitoneal wounds are usually complicated by injuries to the rectum and small bowel, and that a non-penetrating wound of the abdominal wall may cause rupture of a full bladder. Clinically the symptoms were the usual ones of bladder injury. Drainage, suprapubic, urethral, perineal, was indicated. Four cases are reported with one recovery and three deaths.

In wounds of the rectum the entrance wound is usually in the buttocks and, as a rule, fracture of the pelvis and injuries to the small bowel complicate the case. Hemorrhage is profuse, and appears from the rectum as well as internally. The treatment is that of the complications. Two cases are reported with two deaths.

The conclusions are as follows:

1. In the majority of penetrating abdominal wounds operation offers the best chance of success. Spontaneous recovery rarely occurs.

It is advisable to wait one or two hours for symptoms of shock to abate unless evidences of progressive hemorrhage are found. Warmth and 1 cc. of pituitary extract are used.

3. Three to four pints of saline administered subcutaneously during operation and closed ether anesthesia are to be recommended.

4. Careful abdominal inspection and examination before instituting treatment is advisable.

5. In early cases of extensive peritoneal soiling the abdominal cavity is to be washed out. After peritonitis has set in, drainage only should be used.

6. Speed and every possible avoidance of shock are important factors.

7. Post-operative rectal saline and subcutaneous infusions are to be recommended.

8. The prognosis depends on the degree of injury

and the time elapsing before treatment is instituted. Early operation offers the best and surest chance of ultimate success.

P. M. CHASE.

Abadie, J. The Treatment of Penetrating Wounds of the Abdomen (A propos d'un traitement des plaies pénétrantes d'abdomen). *Bull. et mém. Soc. de chir. Par.* 6 6 111 480.

The author reports on two series of observations: those treated by laparotomy and those which recovered in spite of non-interference and in which the proof of penetration had been made either by X-ray or by visible wounds.

Laparotomy was performed on 5 cases in 9 months, including cases tangential to the peritoneum, univisceral intestinal perforation, laceration of the liver, laceration and perforation of the intestines, perforation of the rectum, bladder and small intestine, all these cases recovered. The cases upon which a laparotomy was performed and the individual succumbed included multiple sectioning of the small intestine, rupture of the urethra, perforation of the colon, crushing of the cecum, perforation of the iliac fossa, and double perforation of the bladder.

It is generally admitted that wounds made by bullets are less grave than those inflicted by fragments of Howitzer shells. However, the proportion of cases wounded by one or the other means, depends upon where and how the fighting is carried on. The method of fighting in trenches closely situated explains the rarity of bullet wounds, and those occurring are extremely severe due to the short distance. The author has never seen a case of a wound of the buttock with abdominal penetration recover without actual interference; the peritonitis reveals the seriousness of small orifice (an anodic appearance). The presence of perforations or lacerations of the vesicle aggravates the prognosis considerably. One of the author's cases on whom he operated recovered, three died.

Whether or not to operate at once in shock or to postpone the operation is a question of considerable importance. Frequently the wounded have to be carried for a distance of 100 meters, and as the shock reveals two essential causes, severe hemorrhage or nervous shock, the selection of treatment is momentous. A hemorrhage that has allowed a patient to be carried 5 kilometers could be modified momentarily in its effects by injections with serum and adrenalin. The nervous shock can assuredly be lessened by tonics. The method pursued by the author consists in immediate injection with camphorated oil, either morphine, if the wounded suffers intensely, abundant injections with serum and mg. of adrenalin. If intravenous injection is indicated, it should be given liberally. The injection with serum is continued even during the operation if it is indicated by the patient's pulse. In the majority of cases the author has poured 100 to 150 cc. of ether into the abdominal cavity, notably the pelvic cavity, the anus are cleaned by means of compresses im-

hibited with warm serum in two cases he has replaced the ether by salt solution. Pelvic drainage has been practiced in all cases but one sometimes a second drain is inserted toward the lesions. For lateral and terminal anastomoses the author praises the efficiency of the coupled forceps of Temoin.

Post-operative care consists in absolute diet Fowler's solution by the drop method rectally. A maximum absorption of 4 to 5 liters a day is considered sufficient.

The author recommends the establishment of surgical stations near the front systematic arrangement in the immobilization of surgical ambulances for a small place especially for laparotomies during fighting specialization of a unit for that purpose where the number of units is sufficient if not sending a reinforcing unit with assistants and all the material necessary for efficient treatment.

The author believes that the treatment of choice for penetrating abdominal wounds in war as well as peace is laparotomy. RAOUL L. VIGORAN

Lancet T. F. The Acute Surgical Abdomen. *Med R.* 9, 6, 1918, 648.

The author's paper is based on a recent series of unselected acute abdominal cases operated on by him at the St. Laurence Hospital, New York, most of them desperately ill, such as one finds coming into an emergency service by ambulance. He makes a special plea for the early recognition and prompt operative procedure in this class of cases.

The following is a classification of this series of 30 acute abdominal lesions:

In Group A, in 19 cases, or 63.3 per cent of the total, the appendix was the offender. Of these cases 8 had had one or more previous attacks. In 6 cases the inflammatory process had not extended beyond the walls of the appendix, that is they were operated upon early. In 6 cases of appendicitis the damage had extended beyond its origin, causing a local peritonitis with limiting adhesions. In 3 cases diffuse peritonitis had resulted from delay in submitting to operative interference. Of these 19 cases of appendicitis only 6 were seen early that is before the infection had extended beyond the appendix.

In Group B, in 5 of the total cases the uterine adnexa were at fault.

In Group C, in 3 cases the biliary passages were the site of the lesion.

In Group D, there were 3 acute operative cases: a case of abscess between the layers of the mesentery of the small intestine; a subdiaphragmatic abscess of the left side, traumatic in origin; and a case of diffuse peritonitis thirty hours after perforation of a duodenal ulcer.

The leucocyte count proved valuable, especially in cases with little or no elevation of temperature, low pulse rate, and slight abdominal signs, as in many of these cases the increased total count or preponderance of polymorphonuclear cells in the

differential count was the only evidence of the seriousness of the lesion.

Abdominal muscular rigidity, pain and tenderness and a blood picture that shows a high total white cell count and a high percentage of polymorphonuclear cells in the differential count, either one constitute the essential trial for demanding operative exploration of the abdomen. The only exception would be in a case where the surgeon was sure that these signs were due to a gastric salpingo-oophoritis which should be treated conservatively at the beginning. EDWARD L. CORNELL

Crispin E. L.: Visceral Crises in Angioneurotic Edema. *St. P. J. M. J.* 1916, 11.

A large number of patients suffering from visceral crises, particularly of the erythemic, purpuric, angioneurotic group, are advised to undergo surgical operations.

The author calls attention to this group of cases and discusses the diagnostic importance of visceral crises more from the standpoint of value in negating or avoiding surgery, which does not give relief than from the standpoint of too closely differentiating interrelated medical conditions.

Severe abdominal pain, which does not conform to the true surgical types, may be confused with visceral crises for which surgery would be of no benefit.

When a history of severe abdominal pain is given which does not conform to true surgical types, careful inquiry should be made as to the presence at any time of urticaria, erythema, purpura, and swellings of angioneurotic edema types.

A history of recurrent severe abdominal pains with constancy in the nature and duration of the attacks with skin manifestation of any of the exudative erythemic forms, with or without noticeable association with the abdominal pains, should excite suspicion as to the presence of crises of angioneurotic type.

A diagnosis of visceral crises of angioneurotic type should not be made until careful examination has excluded or made independent surgical causes. In this roentgenologic examination of the gastrointestinal tract is valuable negative evidence. Syphilis and tuberculosis should be excluded.

The constancy in the recurring attacks of pain not conforming to surgical types in patients who have had skin manifestations of the exudative erythema group and whose general condition does not account for the suffering they have had to bear, will warrant a diagnosis of visceral angioneurotic edema.

Repeated or even single attacks of intestinal colic, with tumefaction, in which the patient's general condition is too good for the extent and severity of the trouble and in which history of swellings can be obtained may be of this type. To wait is good surgery. The rapid return to health is strongly suggestive of visceral angioneurosis.

Having determined the medical nature of these

gioneurotic visceral crises even in these cases of agoneurotic edema or the entire exudative erythema group, we should endeavor to work out the sources of toxemia. These may be foci of pus in the upper respiratory tract and sinuses, bacterial absorption, idiosyncrasies to heat, cold, chemicals, parasites, carbohydrates, or proteins that are the causes for anaphylaxis.

Removing the causes for anaphylaxis whether it be idiosyncrasy in one patient for ice cream—some constituent or the cold—banana in another alcohol in a third, or any anaphylactic base or source of exogenous or endogenous irritation or poison, may give the patient relief that the advised surgery would not have given him.

EDWARD L. C. SMELL.

Makins, G. H. A Study of the Symptoms and Complications of Gunshot Wounds of the Solid Abdominal Viscera. *Brit J Surg* 9 6 44, 643.

The author reports his observations on a series of gunshot wounds of the solid abdominal viscera, these observations were made in a base hospital and do not include the immediate results of the wounds.

In wounds of the liver especially those made by bullets, in many cases no evidence of liver injury is detected except that afforded by the course of the missile, provided the bullet or no large vessels are injured. Thirty-seven cases only are reported on the grounds that the liver wound was the chief element and as illustrating the varying degree of gravity which lesions of this organ may assume.

Two classes of wounds were observed (1) those of a rupture due to contusion and (2) simple perforations. The liver offering considerable resistance as it does, is frequently comminuted or ruptured.

The most common course of the missile is transverse. Of the 37 cases, 1 were transverse. Also the simple furrows often give rise to more trouble some and persistent hemorrhage than the perforating wounds.

Shell wounds are usually most extensive they frequently give rise to secondary hemorrhage, and almost invariably are seriously infected from the start. Under these circumstances it is the rule to have progressive necrosis and sloughing of a great part of the liver.

The most common coexistent injury is pleural and lung involvement. In the 37 cases, 5 showed pleural injury. Next in frequency come injuries of the stomach. Wounds of the right kidney are not rare but have a very good prognosis.

The symptoms and signs may be entirely wanting or very slight. Of the 37 cases, 7 showed no physical signs of liver injury. However bleeding into the peritoneal cavity is one of the most common results and may lead to a rapidly fatal issue at best. It is one of the most troublesome complications and is not often seen at the base hospital. If injury is on the inferior surface the blood will collect

in the lesser sac and if on the anterior surface it will eventually collect in the pelvis.

Secondary bleeding usually occurs about the tenth day and is always associated with septic infection. In the series it occurred 4 times. It is accompanied by pain, abdominal distention, rise of temperature and acceleration and loss of pulse volume.

In 1 of the 3 cases, urine was observed being deepest in serious septic infection. Deep staining of the urine is rare. It is believed to be hemolytic in origin.

The most characteristic sign is the escape of the bile from the wound. Some form of biliary fistula was present in 5 cases of the series. Persistence depends mainly on the size and degree of infection of the wound. Of the 5, 7 showed fistula opening by a view of the pleura and all recovered. In none was the object in the bile in the peritoneal cavity noted and in 1 was the gall bladder perforated.

With an open infected shell wound temporary suppuration is the rule but is of great importance. The formation of secondary abscesses however is grave matter. In the 37 cases, 4 subphrenic abscesses developed with deaths and recoveries.

The post mortem records show that of 5 deaths 60 per cent were due to sepsis and 40 per cent to secondary hemorrhage. The most prominent complication causing death was hemothorax. 7 cases died from infection from the effusion. There were 3 cases in which kidney wounds complicated the liver injury. Practically all the deaths may be attributed to sepsis as secondary hemorrhage is always due to infection.

The treatment at the base hospital is purely expectant. If the missile is easily accessible it may be removed otherwise no fresh incision is made.

In wounds of the spleen, diagnosis is rarely made on any grounds beyond the position of the external wounds and the direction of the internal track. Left hemothorax is the most prominent complication, followed by renal injury.

Spontaneous healing is to be expected with simple perforations and moderate lacerations of the spleen. Death from hemorrhage from this organ is not at all common.

Injuries to the pancreas are just as difficult to diagnose as those of the spleen and are usually found at operation or autopsy. Three cases of wounds of the pancreas are cited.

In injuries to the kidneys the simple perforations may often be regarded as negligible. Twenty-seven cases are included under this head as showing the complications most frequently associated with injuries to the kidneys. In 2 of these cases the wound of entry or exit was in the loin.

The most common complications outside of injuries of the hollow viscera are wounds of the liver, spleen, and pleura.

Among the signs and symptoms, hematuria is the most prominent, although often absent. It is rarely severe or persistent. In the series, only

showed primary hemorrhage. Likewise the degree of hemorrhage in no way was with the severity of the damage to the bladder.

Two interesting cases of kidney wounds are described.

Secondary bleeding after an injury usually about the green field. In every case the urine was infected. Hemorrhage occurs either as a persistent hemorrhage or as a perinephric hemorrhage. This latter rule is seen in the bladder and alone. Primary hemorrhage is usually accompanied by the presence of a large amount of blood in the urine. The temperature rises to 100° F.

In rupture of the kidney is usually accompanied by a large amount of blood.

Extraperitoneal hemorrhage is no common. It is believed that the extraperitoneal kidney does not secrete blood as the escape of urine externally during an injury is no abundant. Extraperitoneal hemorrhage was noted in cases of the series. This condition is more marked where the kidney is perforated.

The mortality after a case of death is secondary hemorrhage. In all cases were due to this cause.

Original trauma as he is wounded in the cases of the spine in the and hemorrhage.

In the repair of the parametrium. Operation is rare repair of primary hemorrhage. However it is a hopeless damaged should be removed.

Primary hemorrhage nephrectomy is indicated and is a difficult thing to the communication of the organ and the circulation of blood.

A large blood vessel the bladder should be removed. In primary hemorrhage suture pack in the parametrium. The need of nephrectomy is rare. P. M. CHASE.

Wells, B. H. The Care of Abdominal Surgical Cases.

The patient is seen, examined and treated. The patient is the New York Polytechnic so that the general physical as well as their personal and mental conditions is obtained. If patients are needed they are admitted to the hospital and prepared the preparation of all the organs of the body and of a mild laxative is given. The day preceding operation is followed by an enema in the evening to either the preparation of the skin.

Here purgation is avoided as being unnecessary and the patient is all as a source of great discomfort to the patient. The author strongly emphasizes his point as there are ill men who employ these measures to clean out the intestinal tract.

Usually the evening before operation the abdominal is washed and scrubbed with a tincture of green

soap and warm water. The patient is given a glass of water. The patient is given a glass of water.

When the patient is in the hospital, the patient is given a glass of water.

dry skin is put on the patient. The patient is given a glass of water.

After the patient is in the hospital, the patient is given a glass of water.

A mild diet is given to the patient. The patient is given a glass of water.

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McCrae, T. and Coplin, W. M. L. Gelatinoid Carcinoma (Morbus Gelatinosus) of the Peritoneum. *Am. J. M. S.* 9 6 cil, 475

An account is given of a case of gelatinoid carcinoma of the peritoneum in a male negro aged 41 who had been troubled with chronic ascitis for four years, and had had 57 successful tapplings. For three years the fluid showed no particular features, then gelatinous colloid material appeared and was present for a year until death occurred. During the greater part of this period the patient's condition was excellent. The liver and spleen showed enlargement to time and later became red ced in size. Shortly before death many hard round movable masses were found in the abdomen. There was intractable diarrhoea for the last few weeks of life.

At autopsy it was found impossible to find the primary seat of the disease because of the matting together of all the viscera. The diaphragm had been perforated by the growth and metastatic nodules were found in the lungs. The universality of the retrograde changes in the epithelium not commonly encountered in cancer the authors think was due to some condition which their study failed to disclose. Apparently the proliferating epithelium encountered some antagonistic influence which was constantly breaking it down. Complete early removal of the disease may be curative. Even incomplete removal of the mass may be followed by long intervals before recurrence takes place.

ILL. G. SLOW

Handley W. S. A Method of Treating General Peritonitis with Obstruction; its Application in Military Surgery. *Bru. M. J.* 9 6 4, 59

The author discusses those cases of general peritonitis in which the accepted modes of treatment have failed to avert or relieve paralytic obstruction of the bowels and cites a case successfully treated along lines laid down in his article.

In cases of general peritonitis where the picture is one of complete obstruction death is only a matter of hours. Immediately preceding this stage however is one not described in textbooks, wherein, while obstruction is usually complete the pulse is relatively good, the vomit is not offensive, and the abdomen rigid below the umbilicus but moderately soft above with slight respiratory movements. This is the last stage in which surgical interference may help.

Fortunately general peritonitis is rarely universal. The infection no matter where its source, as a rule begins in the pelvis and gradually spreads upward gravity having carried the septic material downward. Thus there is quite a period in the disease in which the upper abdomen, i.e. above the umbilicus, is comparatively free from infection.

Likewise the presence of persistent active vomiting may be considered hopeful, in that it shows that the stomach and upper intestine still retain their contractile power although reversed. Hence,

Handley believes that surgical interference in the upper abdomen before general collapse, is advisable and should be considered. This interference should involve only the stomach, jejunum and transverse colon.

Jejunostomy falls it is believed because it cuts off the supply of fluid to the mucosa of the large intestine. Handley however recommends a jejunocolostomy to the transverse colon with cecostomy and pelvic drainage. This relieves the vomiting establishes an emergency intestinal canal which supplies the body with clean food and fluid and obviates the necessity of overcoming the general infection.

This procedure the author states may be carried out quickly and easily and practically without shock.

A case is cited in which after an operation for pelvic appendicitis with beginning peritonitis the symptoms of intestinal obstruction supervened giving a characteristic picture of ascending peritonitis with total obstruction. A jejunocolostomy with a cecostomy was then done with immediate improvement and complete recovery.

In closing Handley states, I hold no brief for my conclusions and only ask that they shall be tested.

P. M. CHASE.

Saliba, J. Th. Antiseptic Action of Ether in Peritoneal Infections. *J. Am. M. Ass.* 9 6, ivii, 295

Saliba states that he has introduced ether into the abdominal cavity as a routine measure in 248 hospital cases of peritoneal infection. The injection is made with a syringe just before the last peritoneal cure is tried.

He concludes as follows:

Ether experimentally and clinically has been proved to have bactericidal action.

In peritoneal infections it is safe and beneficial antiseptic.

3. The dose of ether instillation into the peritoneal cavity is one ounce for child above four years and three ounces for adult.

4. Generally no untoward after-effects and complications follow its use.

5. Any possible toxic action of ether on the various body organs is very slight. A. LAMBERTSON.

Finochietto R. Retro-Inguinal Hernias. *Surg. Gynec. & Obst.* 9 6, xvii, 554.

Retro-inguinal hernias (Corbellini, 1906) are the right hernias of the classics, the internal hernias of Tillaux, the juxtafuniculaires of Villere.

They are called retro-inguinal because coming outside, they push before them the posterior wall of the inguinal canal the transversalis fascia. They are found in 63 per cent of hernias, coming to operation. The principal alteration of the walls is an atrophy of the conjoint tendon and Hassert's triangle.

The hernial tumor is slightly attached to the cord, but its base is fixed, owing to its continuity with the

transversalis fascia, which in this place presents its fibers of reinforcement strong but separated.

According to the predominant element in the hernial tumor, i.e., the peritoneal sac, the peritoneal fat or viscera, the hernias are classified in the order of their frequency: a) 73 per cent lipomatous; 20 per cent aplanchnic; 6 per cent. In the lipomatous variety occupying the under part of the base of the hernia there is found an ample cavity with walls formed by connective tissue, which is a prolongation of Bogros space. These three varieties of retro-inguinal hernias are independent of each other; they do not follow one another.

Simmons, C. C. The End Results in Seventy Consecutive Cases of Umbilical Hernia Operated upon at the Massachusetts General Hospital. *Boston M J U S J* 916 decr 34.

The length of time the cases were followed after operation was from one to four years. Cases with out recurrence at the end of one year were considered cured since the records showed that all previous recurrences took place within one year from operation.

The operations reported were performed by 21 different surgeons. The three main types were: (1) closure of the ring vertically with or without overlapping of the aponeurosis; (2) transverse closure of the ring without overlapping; (3) transverse closure with overlapping of the aponeurosis—the Mayo operation. The author described his technique in the last method which he has used in 14 cases without recurrence.

Simmons divides the cases into three groups: (1) children and small hernia in thin adults; 15 cases, 10 traced, all cured by various types of operation; (2) stout adults; 45 cases, one death directly attributable to the operation for hernia, a mortality of 2.4 per cent. Six cases of strangulated hernia were included in this group. Of these 45 cases the hernia recurred in 10, or 22.2 per cent. In 30 cases closed by the Mayo method 10 per cent recurred. In 14 cases closed vertically with or without overlapping 42.8 per cent recurred. Local sepsis apparently played little part in the recurrent cases of 31 clean cases, 6 recurred of 14 in which there was local sepsis, 3 recurred. Of the recurrent cases 4 were sutured with chromic gut, 2 with kangaroo tendon and 3 with non absorbable material.

The recurrent cases are described in detail and the cases in each group carefully analyzed, the following conclusions being reached:

1. Small umbilical hernia in thin adults and umbilical hernia in children may be cured by any operation which removes the sac and closes the defect in the abdominal wall.

2. Cases of umbilical hernia in stout adults are difficult to cure. The Mayo operation of transverse closure of the ring with an overlap of the aponeurosis gives the best results.

3. In adults closure of the ring by any other method than the Mayo in a general hospital is followed

by 46.4 per cent of recurrences. Recurrence if it is to take place usually does so in less than one year.

4. The suture material employed has no relation to the liability to recurrence.

5. Skin sepsis is very likely to occur but apparently has no relation to recurrence.

F. FISH HILL

GASTRO-INTESTINAL TRACT

Gasbarrini, A. The Ionic Concentration of the Gastric Contents in Some Stomach Diseases. (Sulla concentrazione ioni del contenuto gastrico in alcuni malati dello stomaco). *I ter I Beitr path u ther d er hr* 33 95 33.

The author used Sorensen's lately introduced calorimetric method of estimating the ionic concentration of the gastric contents. This ionic concentration gives an index of the dissociation of hydrochloric acid, i.e., of the amount of free hydrochloric acid in the stomach.

The author submitted to this process the gastric liquids from 36 patients with various stomach diseases and from his results he is of the opinion that the calorimetric method is excellent for clinical diagnostic examinations.

The method and technique are fully described, also a detailed tabular statement is given of the 36 cases examined—gastric ulcer, dyspepsia, etc.—and the findings in each case. W. A. BRENNAN

Friedman, J. C. Time Relations of Gastric Pains, with Special Reference to Gastric Adhesions. *Am J M S* 96 cli 35.

Friedman reports a number of operated cases of gastric pain with special reference to the time of occurrence as a diagnostic help. He divides all gastric discomfort of the intragastric and perigastric regions into continuous and intermittent varieties. The continuous pains are most frequently due to carcinoma to marked pyloric obstruction, and to penetrating ulcers with peritoneal involvement. The intermittent pains are divided into immediate early and late. The immediate are found frequently in ptosis, nervous obstruction of the cardia, and various other conditions.

The early pains including those occurring fifteen to sixty minutes after eating are most often due to adhesions in any part of the stomach including ventral hernias and pericholecystitis.

Late pains include those occurring one to three hours after eating and indicate an increase in intra gastric pressure or pylorospasm of which the most frequent cause is hyperacidity. J. W. TORREX

Barbacci, O. Gastric Volvulus in Hour Glass Stomach of Congenital Malformation 366 of Rotation (Volvolo gastrico in stomaco a forma di pe. malformazione congenita—366 di rotazione). *Rf m m d* 96 xxiii 4.

Volvulus of the stomach is undoubtedly a rare affection and there are only 30 observations of it.

on record. In recent years it has been seen more frequently than in the past owing to the greater number of surgical interventions. The affection occurring in a so-called hour-glass stomach where the rotation is in only one gastric segment is still rarer. There are only a few observations of this kind. It is exceptional for the rotation to exceed 360°. Only 3 cases have previously been recorded in which the rotation reached the limit of 360°. The author now adds a fourth to these 3 cases. The clinical history of the case is wanting. The patient reached the hospital in a moribund condition and died shortly after his entrance. The particulars were gleaned from the autopsy. On opening the abdomen there was found in the left precordial region a sac the size of a child's head of semi-ovoid shape, the base being above and the apex below. It reached to the level of the iliac crest, at which point it was twisted upon its axis and evolved into another apparently smaller sac of semilunar shape, which occupied all the right hypogastric region and had a general direction from left to right. On the left of this sac were two greatly distended loops of intestine, the upper corresponding to the descending colon and the lower to the sigmoid colon which was buried in the lower pelvis. On the right side of the sac was another distended loop which corresponded to the ascending colon. The viscera generally were malformed and displaced.

The lower of the two sacs referred to has undergone a torsion on its axis. This torsion amounts to 360° so that the anterior face of the sac which is presented to view is really the visceral anterior face after complete twist. This torsion is verified by complete removal of the sac and its attachments.

From the detailed findings the anatomic diagnosis was gastric volvulus in bilocular stomach with 360° of rotational abnormal mobility of the pylorus and duodenum, congenital malformation of the gastrohepatic ligament, slight pulmonary emphysema with hypostasis and edema, degeneration of the myocardium and liver, hepatic calcosis, deficient aortic, splenic and renal arteriosclerosis, etc. Histologic examination showed no alteration whatever in the stomach walls in either sac.

The author thinks the two conditions in this case which merit special attention are the bilocular conformation of the stomach and the gastric volvulus. Bilocular stomach is not rare. It may be congenital or acquired, although many authorities deny the existence of congenital variety.

The author is so convinced that in his case the deformity was congenital and gives his reasons discussing the theories of other writers, Barnabo, Veyrassat, Bédinger, W. Stein, etc. who have devoted considerable attention to the occurrence of this congenital anomaly. Veyrassat has laid down the dictum that in order to be considered congenital the following should be fulfilled:

The biloculation should not cause any gastric disturbance during life.

It should not disappear under the influence of insufflation of the stomach.

3. It should not be accompanied by any appreciable lesion of the gastric tunica.

Biloculation is as likely to be met with in the foetus and in the infant as in the adult and the old.

In the above case the second and third conditions were fully met. The first condition could not be established owing to the lack of sufficient history of the case.

The author next takes up in detail the consideration of volvulus occurring in connection with bilocular stomach. From review of the literature of the subject he reduces such cases to only two. He gives a short résumé of these 2 cases. Only in the 3 cases reported by Hedlung, Schell and Walther, and Kocker did the rotation reach the limit of 360°, as in the above case and that of Schell and Walther was the only one in which the other concomitants agreed with those of the case now reported. The above case is therefore unique.

W. A. BREYER

Burge, W. L. and Burge, E. L. The Cause of Gastric Ulcer. *J. Am. M. A.* 1906, lvi, 908.

In accordance with the theory that gastric ulcer is caused by decreased resistance in the limited areas of the gastric wall the authors undertook this investigation to determine experimentally if possible whether or not such diminished resistance would give rise to gastric ulcer. The point to what has been known for some time that the resistance to the action of the digestive juices of limited portions of the mucosa of the stomach is decreased by cutting off the blood supply to these portions, as for example, by a clot in a small blood vessel (thrombosis) or by the ligation of the vessel and that under such conditions the area is digested by the pepsin with the formation of an ulcer. The fact that gastric ulcer occurs so frequently in anemic persons led to the advancement of the theory that the oxidative processes are decreased and that this may be the cause of the diminished resistance of the tissues.

Working upon the theory which assumes that normally a balance exists between the oxidative processes of the cells of the mucosa and the digestive action of the pepsin in the stomach, and that if this balance is destroyed, as for example by depriving a limited area of oxygen by cutting off the blood supply and thereby decreasing the oxidative processes of the area, this area should be digested by the pepsin with the production of ulcer, the authors derived numerous experiments to imitate the protective mechanism as thus set forth. From their experiments they are able to draw the following conclusions:

The decreased resistance of a circumscribed area of the stomach to the digestive action of gastric juice is due to a decrease in the oxidative processes of the cells of the area. Gastric ulcer is due to the subsequent digestion of the area by pepsin.

2. The resistance of unicellular organisms (para-

mediums) to the digestive action of the proteolytic enzymes can be increased or decreased by increasing or decreasing the intensity of the oxidative processes of the organisms the greater the intensity of the oxidative processes the greater the resistance and vice versa.

GEORGE E. BRILAY

Elliot T. R. and Henry H. Traumatic Gastric Ulcers. *Bri M J* 9 61 523

The formation of gastric ulcers following trauma to the stomach is discussed.

Surgical work with the army in France has proved conclusively the value of early operation in gunshot wounds of the abdomen. It is the consensus of opinion that any wound of the intestinal tract is less likely to be fatal if repaired immediately than when left to rest and nature although Surgeon General Sir George Mackenzie claims that it is unwise to open the abdomen in cases where only the stomach is supposed to have been wounded.

While the chief danger in intestinal wounds is from peritonitis in stomach wounds it is less to be dreaded as frequently adhesions seal the aperture and the gastric contents that do leak out are not very septic. However the real danger in this latter class is from secondary hemorrhage due to erosion of the injured tissues by the gastric juice.

Immediate hematemesis and melena are rare as the bleeding is usually intra or retroperitoneal. However these symptoms often appear during the second week and then are to be interpreted as due to an extending ulcer of the stomach or duodenum. These ulcers are the exact counterpart of the non-traumatic ones with the exception that gastric fissure is much more liable to formation in the track of the initial injury.

A detailed clinical report is given of the 4 illustrative cases 3 of which died 2 from uncontrollable hemorrhage and one from widespread septic infection. In all 4 cases the missile either penetrated the stomach or came so close as to cause a direct injury to the wall. None of the cases was operated upon and hematemesis and melena occurred in each during the second week.

In the case which recovered the stomach was probably contused and recovery from following ulcer unexpected as the rule in these cases is subsequent death.

P. M. CHASE

Verbruyck J. R. Jr. Post-operative Treatment of Peptic Ulcer and Cholecystitis. *Med Rec* 9 61 vii 74

The first step in the post-operative treatment begins at operation. Whenever possible the ulcer should be exposed kept from contamination and examined for organisms from which autogenous vaccines can be prepared and administered during convalescence.

There can be no routine treatment for ulcer after operation. The individual patient must be treated bearing in mind the possible cause of the trouble

the character and position of the ulcer found at operation and the nature of the operation itself.

In cases of excision it is necessary simply (1) to regulate the diet for from ten to fourteen days (2) to administer atropine or belladonna to prevent spastic contraction of the pylorus which would tend to produce further trouble (3) to make and administer autogenous vaccine (4) to avoid irritating purgatives (5) before the patient is discharged to make search for the original focus if it has not already been located and take steps to eliminate it and (6) to instruct patients to report at least every two months for a year with a specimen of stool while on meat-free diet for three days to be examined for occult blood.

Not only does the location of the ulcer influence the after treatment but also the conditions found at operation. A large callus ulcer of many years' duration if ever curable by rest will certainly take longer than a small non-indurated one. Perforated ulcers naturally demand certain other treatment which comes purely under the domain of the surgeon such as (in acute cases) the Murphy salt solution and the Fowler position. For some reason perforated ulcers seem to tend to heal without much difficulty after the perforation is closed.

Ordinarily results in gall bladder cases may be said to be decidedly better than those following operations for ulcer however the number of secondary operations required and the not inconsiderable number having a continuance or recurrence or trouble after drainage or even removal of the gall bladder would indicate that there is room for improvement in the treatment. The author believes that the reason for many of the poor results lies in the fact that the original factors which caused the trouble have not been influenced.

The patient should have an individual diet list based upon the condition of digestion and the weight but in all cases fat should be restricted to a greater degree than the other food products. In the obese fat reduction should be practically absolute for a time so that the patient may use up some of his own. Some control should be kept over the fat ingested for at least a year. If the bowels tend to become sluggish from the absence of fats mineral oil which lubricates without being digested may be given.

Next to fats the carbohydrates should be restricted. Judgment is required in determining how far this may be safely carried. Proteins are allowed in sufficient quantity to maintain nitrogen equilibrium. All of the vegetables that are desired may be taken also fruit provided the chemical condition of the stomach does not contraindicate its use.

The bowels should be kept open. If necessary will help with the addition of Carlsbad or Epsom salt when required.

After convalescence exercises should be prescribed. Outdoor exercises such as walking, golf, etc. especially if the patient has special local troubles which tend to irritate the stomach.

tion, and correct sluggishness of the biliary as well as the whole digestive tract.

Post-operatively 15 grains of hexamethylenamine a day should be given for a number of months unless contra-indicated by some untoward action. One five-grain tablet of sodium glycocholate or its equivalent two or three times a day should be administered for some months.

Thyroid extract, for its action on fat metabolism, should be used temporarily in the cases in which it would seem that there was deficiency of thyroid secretions with poor oxidation. Small doses should be used at first, and close attention paid to the blood-pressure and pulse. EDWARD L. CORNELL.

Mackay W. A., and Macdonald, I. Perforating Pyloric and Duodenal Ulcers. *Edin Med J* 9 6, xvi, 350.

The article briefly reports three cases of perforating pyloric and duodenal ulcers with perforation. One died and two recovered. These three cases were from a series of 250 operations for gastric and duodenal ulcers occurring in the authors' experience in southern Spain.

All the cases gave the typical history of duodenal ulcer of several years standing.

In the first case, perforation occurred in the middle of a large cedematous mass occupying the pylorus, which prevented the sutures from holding. Under these circumstances, the abdomen was thoroughly dry-swabbed and the pyloric portion of the stomach belayed to the abdominal wall. Two drains through the incision and one through the loin to the kidney pouch were used, being removed on the ninth day. Uneventful recovery followed and two months later gastro-enterostomy was done.

In the second, perforation occurred in an ulcer densely adherent to the posterior border of the liver making suture impossible. The leak was stopped by an mental tag, the abdomen dry-swabbed, a large drain put under the liver, another through the lower end of the incision and a third over the pubis into the pelvis. This patient suddenly died on the fourth day after developing a duodenal fistula.

In the last case, small perforation occurred in an old ulcer scar on the front part of the duodenum. This was closed by a single catgut suture followed by continuous suture of the serous coats, and tag of gastrohepatic omentum sutured over all. Following this a posterior gastro-enterostomy was done. One drain was then placed under the liver and a second above the pubis into the pelvis. These were removed on the third day and uneventful recovery followed.

The authors strongly recommend pelvic drainage and immediate operation. P. M. CHASE.

Morgan, E. A.: The Post-Operative Management of Pyloric Stenosis. *Am. J. Dis. Child.* 9 6 xi, 245.

The author's study is based on the personal observation of fifty children who were operated on in

the Babies Hospital of New York during the last two years. The post-operative results are dependent to no little extent on the pre-operative condition of the patient.

The maintenance of the body temperature is of paramount importance. A sudden loss of body heat has, in some instances, been the undoubted cause of collapse occurring a few hours later.

The greatest danger is in the exposure incident to the operation, and to minimize this it is advisable to encase the infant's legs and arms in non-absorbent cotton. Under the pad the operating table is placed a hot water bag which fits into the small of the back and serves the double purpose of supplying warmth and keeping the site of the operation well elevated.

The removal from the infant's stomach, by gastric lavage, of food residue and gas accumulation is the next most important pre-operative measure.

The post-operative management of the maintenance of the body temperature is as before, of the utmost importance. The infant is wrapped in a warm blanket or cotton jacket and the bed is well equipped with hot water bottles.

The first hour after the head of the bed should be lowered. After nourishment has been commenced the head if the bed may be raised and from this time on the infant is kept in a semi-erect position. This elevation assists in emptying the stomach, especially in gastro-enterostomy cases, and at the same time permits the escape of gas through the mouth.

The use of extensive hypodermic stimulation after operation is to be deprecated; only one measure, namely hypodermicoclysis of normal saline or of glucose solution, is always indicated and this may be safely used as a routine practice. Of the other stimulants, epinephrin, subcutaneously is the most satisfactory because of the rapidity of its action. Caffein and tropine, hypodermatically are sometimes valuable, and by mouth dilute whiskey or brandy. The value of blood transfusion as a stimulant is very questionable.

A post-operative rise in temperature is to be expected in nearly all cases. No antipyretic measures are needed if the reactionary temperature, except that care should be taken not to use excessive artificial heat. A pyrexia that persists for more than three days, or one that unexpectedly occurs after the first reactionary fever has subsided, should be investigated as it usually indicates some complication.

Feeding is the most important feature of the post-operative care of infants; a slight error in judgment may precipitate a gastro-intestinal upset that is very difficult to control. It is impossible to feed all children by the same set rule, but a general routine is of value and is applicable to the majority of cases. The aim should be as soon as possible after operation, to start nourishment in concentrated and readily digestible form. For this purpose there is no food that can take the place of breast milk and

very effort should be made to procure enough to tide the patient over the first week at least.

An hour after operation, providing the recovery from the anesthetic has been complete, the patient is given 10 c. m. of water and an hour later 15 c. m. of breast milk mixed with 4 c. m. of water. It may be necessary at first to use a medicine-dropper for the administration. The breast milk is repeated every three hours eight feedings a day and is alternated with the water. Both are gradually increased so that twenty-four hours after operation 16 to 24 c. m. of undiluted breast milk is being given every three hours and a similar amount of water between feedings. At the end of forty-eight hours the child is usually taking 20 to 30 c. m. and at the end of seventy-two hours 30 to 45 c. m. at a feeding. The administration of water by mouth during the first three or four days is of the greatest importance. The time required to increase the quantity of milk to meet the caloric requirements of the child has been on an average five days in small babies three days may be sufficient and in the well nourished as much as eight to ten days.

It is wise not to defer putting the baby to the breast longer than one week after operation or when the feeding from the bottle has been increased to about 60 c. m. This is usually on the sixth or seventh day. The nursing must be carefully supervised for the next week the amount taken at each time being measured by weighing the baby before and after. If the quantities obtained are too small the nursing may be supplemented by a modified milk mixture.

In well nourished children a sponge bath may be given every day until the abdominal wound is completely healed and the dressing discarded. In poorly nourished or emaciated infants an oil rub is to be preferred.

Vomiting although it is to be expected in a certain degree in a large proportion of the patients after operation is frequent and troublesome in some cases. The more common exciting causes of vomiting are

1. Distention due to accumulation of gas either in the stomach or in the intestines.

2. Defects in the operation such as faulty adjustment of the jejunum and stomach, or incomplete severance of the constricting muscle fibers of the plastic operation.

3. A too rapid increase of the feeding.

4. The occurrence of complications especially general peritonitis. Of these causes distention due to gas accumulation is by far the most frequent. If it is mainly intestinal a colon irrigation, repeated as often as necessary, is all that is required for relief. When the accumulation is in the stomach the head of the bulb should be elevated and the child frequently raised to the upright position to allow the free escape of the gas. In patients who do not respond to these measures it is well to pass a soft rubber catheter into the stomach before each feeding. Lavage may be employed if the vomiting is persist-

ent but its use in the first two or three days after the operation of gastro-enterostomy entails not a little risk.

Repeated fecal evacuations are usually not seen during the first twenty-four hours. At the end of this period therefore it is well to give a teaspoonful of castor oil to stimulate peristalsis and remove mucus and gas. The first few stools are usually loose and green in color (raw or turpentine like) if there has been any bleeding into the terminal ileum. Normal breast milk stools are not seen as a rule until the fourth day after operation. A too rapid increase in food especially in children who have been vomiting for several weeks prior to operation is very apt to produce loose frequent stools. The measures usually employed for the relief of acute intestinal disturbances are applicable to this condition.

The dressing at operation should consist of a narrow fold of sterile gauze which just covers the incision and is held in place by a adhesive strapping. There is seldom any indication to disturb it for the next four or five days. A binder should not be used. The advantage in using a small dressing is that the least hemorrhage can be readily detected and controlled. The stitches may be removed on the sixth to the eleventh day depending on the condition of the wound and after that a protective pad of gauze is all that is required.

Of the 36 infants discharged in good condition 4 died from a variety of causes none of which were directly associated with the operation. The deaths occurred two weeks after discharge in two instances and two months after discharge in the others. Two children were lost sight of and of the remainder 10 were followed for one or two years after discharge 13 for six months to one year and 17 for less than six months. EWARD L. C. RYAN

Bradford W. H. Chronic Gastric and Duodenal Ulcer. J. M. 15:1, 26, 1, 3.

The results obtained from surgical treatment of patients suffering from chronic gastric and duodenal ulcer have been among the most satisfactory in all the author's surgical experience. The mortality has been exceedingly low. A man with acute perforation of a chronic gastric ulcer died one week after operation. With this exception no deaths have followed surgical treatment.

Among his successful cases the following may be briefly mentioned.

A male aged 30 was operated on eight years ago for a large palpable mass diagnosed as gastric cancer and is now perfectly well.

A male aged 55 had been suffering from gastric ulcer for seven years. In May 1914 he had the pyloric half of his stomach removed and he gained 55 pounds since operation.

A male aged 40 at 60 had been suffering from chronic stomach trouble for thirty years. He was emaciated and anemic. He was operated on for duodenal ulcer in November 1914. After operation his

Improvement was wonderful and he had no further need of medicine.

EDWARD L. CORNELL.

Mills, R. W. Observations on Duodenal Ulcer with Special Reference to Its X-Ray Diagnosis. *Internat. M. J.* 9 6 xliii 68.

The stomach in uncomplicated duodenal ulcer is generally considered to be characteristically hypertonic. Hypertonic stomachs are characteristic of those of asthenic habitus; consequently either the stomach in duodenal ulcer becomes abnormally tonic, or duodenal ulcer occurs in those who naturally have hypertonic stomachs. Mills' thesis in investigation will suggest that both are true. Should certain complicating factors exist, the gastric hypertonus of duodenal ulcer is lost to a degree commensurate with that of the complicating factor. Such factors are: duodenal stenosis, result of ulcer, and general conditions causing atony, such as general debility from hemorrhage and the like.

In uncomplicated duodenal ulcer there is a well-known increased initial motility, early and free pyloric outflow. With stenosis motility is tardied and there may be a six-hour retention. Cap deformity is by far the most valuable and constant diagnostic indication of duodenal ulcer. Callous ulcer situated in the first part of the duodenum is impossible without characteristic and persistent anomaly as to the firmness of the cap, and is at times added to by spasm. A perfect cap means a callous ulcer. Deformity may also occur as the result of adhesions to duodenal ulcer. The contention that small ulcers can exist without cap deformity is in dire need of illumination through illustrated specific case reports. Certain peculiarities of gastric peristalsis occur in uncomplicated duodenal ulcer which were not anticipated before the advent of the X-ray. We have heretofore known of but one clinical condition resulting in visceral hyperperistalsis, namely stenosis.

In uncomplicated duodenal ulcer gastric hyperperistalsis occurs immediately or shortly after the ingestion of the contrast meal, or only without stenosis distal to it, but with a decrease in the resistance normally offered by the tonus of the pyloric sphincter. Mills thinks that all indications are unfavorable to the idea that the pain of duodenal ulcer is due to hypertonicity in either at night or cap the so-called dequate stimulus of visceral pain, but that it is due rather to the nerve-endings in the ulcer-floor becoming actually and abnormally sensitive to excess of hydrochloric acid.

ALBERT MILLER.

Woolsey, G. The Surgical Treatment of Gastric and Duodenal Ulcers. *Med. Rev.* 9 6 lxxviii, 59.

Woolsey advises a thorough trial of medical treatment for gastric and duodenal ulcers, and states that acute ulcers will almost always yield to only cases of perforation requiring surgical treatment. The symptoms due to chronic ulcer will in time subside

with rest without treatment. But relapse is the rule and there is some question whether medical treatment gives permanent cure.

After two or more relapses have occurred surgery should be resorted to. Gastro-enterostomy is the operation of choice. It affects both the drainage and the biliary system of the stomach; the acidity is diminished by the presence of a small quantity of bile and pancreatic secretion; the pylorospasm is relieved and the stomach empties itself without irritant food (the ulcer by the passage of food). Healing occurs in 8 per cent of cases (Paton). Symptoms will persist if due to adhesions or malignant degeneration. Gastro-enterostomy is of certain preventive value if perforation, hemorrhage, but it diminishes the probability of their occurrence. On account of the anatomical structure of the duodenal ulcer of the anterior duodenal wall can be overlooked and search should also be made for the existence of an equivalent ulcer on the posterior wall which is more durable and of the gastric type (cases where the pylorus is stenosed give the best results).

The various methods of operation are: (1) Von Eiselsberg's, the most radical in which the stomach is divided proximal to the ulcer and both ends sutured; (2) Wilms', in which the band of fecal half an inch wide is fastened tightly round the stomach proximal to the ulcer; and (3) the method of infolding the pyloric end by ture.

Simple duodenal ulcer almost never undergoes malignant degeneration; gastro-enterostomy with or without pyloroplasty gives excellent results. It is different in callous gastric ulcers, which, or infrequently become malignant. It is sometimes impossible to differentiate between an indurated ulcer and carcinoma. A radical removal of the chronic ulcer is best in such cases.

The two complications of gastro-enterostomy, venous thrombosis and peptic jejunal ulcer usually of the stomach are avoided by proper technique. The latter uses fine chromic gut for both suture layers.

The more radical operations for gastric ulcer are excision, pyloric resection, and mesogastriectomy. Excision is not a satisfactory operation. Resection is more radical but gives better results.

Ulcers of the pyloric region of the stomach, the Billroth method is the operation of choice. It should be followed by gastro-enterostomy or the Pyloroplasty modification in which the proximal end of the stomach is sutured directly to the jejunum. The chief technical difficulties are due to adhesions, especially in case of penetrating ulcer. When the ulcer is farther from the pylorus, usually on the lesser curvature the mesogastriectomy or resection in continuity is the method of choice. The mortality of resection is greater than that of gastro-enterostomy but the operation is well borne and the mortality not high. In all cases of gastric or duodenal ulcer the patient should be put on a special diet for some time after operation.

The so-called hour-glass stomach which results

from a cicatricial contraction of a gastric ulcer is treated on the same principle as callous ulcers.

The two complications of gastric and duodenal ulcers are hæmorrhage and perforation. Sudden acute hæmorrhage is usually due to acute ulcer and is best treated medically. In recurring hæmorrhages with threatened severe anaemia operation should be done before the anaemia progresses. In cases of dangerous hæmorrhages during transfusion of blood is of great value. In acute perforation early diagnosis and immediate operation are most essential.

Subacute and chronic perforations result in perigastric and subphrenic abscesses, which demand accurate diagnosis to indicate the operation suitable to the case. L. R. GOLDSWORTHY.

Haines, W. D. Some Features in the Management of Surgical Disorders of Digestion. *Lancet*, 1911, 1, 35.

The newer pathology has shown that the organs of an infection occurring in the buccal cavity, the tonsils or elsewhere may be transmitted by the lymph or blood stream to remote parts of the body, thus to form new foci when arrested in the terminal vessels of such organs as the gall bladder, stomach, duodenum, brain or kidney. According to these newer concepts digestive disorders, gastric ulcer, cholecystitis and appendicitis are to be regarded as terminal infections. Gastric and duodenal ulcer must be regarded not as a disease but as the end result of a disease. To successfully cope with the symptoms the original source of infection must be removed. Pus must not remain unchallenged anywhere in the system.

The author is convinced that 10 per cent of digestive disorders may be cured by removal of some extragastric pathological condition, the source of the disorder being an overloaded colon, infection of the pancreas, gall bladder, gums, sinuses or tonsils.

The mortality following perforation of an ulcer increases by leaps and bounds after the first few hours and immediate operation is imperative. The thick indurated mass associated with chronic pyloric ulcer should be removed, but these patients are in such poor condition from prolonged starvation that they are poor surgical risks and the better practice is to do a two-stage operation, a primary gastrojejunostomy and a secondary resection after recovery from starvation. Occasionally one finds that the mass at the pylorus has entirely disappeared. In this case the second operation terminates as an exploration.

Hyperæmæmia is a symptom difficult to relieve. Calcium chloride and horse serum may tide the patient over until an interval operation may be done. The discrepancy between the size of the ulcer and the amount of blood lost may be great. Perigastric adhesions are prone to undergo contraction with the production of obstructive disturbances in the stomach. When firm it is better to provide a pleurostomy for the stomach in preference

to making extensive laceration with subsequent production of new adhesions. In the vast majority of instances separation of adhesions is but temporary and permanent benefit may not be expected.

The author's experience with cancer of the stomach has been discouraging but unfortunately only means by which life may be prolonged. It has been said that gastrojejunostomy and resection of the subsequent development of carcinoma, but several cases are mentioned in which the perforation of a clinically benign ulcer is followed by cancer within the following 12 months.

One third of all cancer of the stomach is located in the stomach and the vast majority originate in the margin of an unhealed ulcer. He who recognizes this and deals with the ulcer for malignancy has begun to diminish the sum total of human life. J. K. AUSTIN.

Childert, H. Intestinal Adhesions. *Chirurgia*, 1910, 5.

From the viewpoint of the author's experience would seem to include the frequency to be:

1 Former attacks of inflammation in some intra-abdominal organ.

2 Injudicious manipulation, negligent attention in necessary handling of the intestines and other intraperitoneal organs during previous operation.

3 Traumatism through external or internal hernia of the abdomen including the too frequent reduction of hernia; the improper application of truss pressure and the injection treatment of hernia.

4 The use of drainage after operation, either capillary or tubular.

5 Imperfect wound healing with resulting ventral hernia.

6 Idiosyncrasy—some patients seemingly predisposed to the formation of adhesions even upon the most gentle manipulation.

The prevention of adhesions following operations upon abdominal organs depends upon the following factors:

1 Gentleness of manipulation in all necessary handling of tissues.

2 The avoidance of unnecessary exploration by more careful case taking and more accurate drainage.

3 The free exposure of the abdomen sufficiently large incisions and especially by posture to minimize the necessity of blind and blunt separation of adhesions.

4 The use of moist rather than dry packs, except when their retention may be indicated for protective.

5 The avoidance of drainage where possible.

6 The covering of all denuded surfaces.

7 The use of normal salt solution poured into the peritoneal cavity after completion of operation.

8. The early establishment of and continuance of peristalsis.

9. The assumption of a posture favoring the prevention of contact with sutures or ligated parts.

10. The frequent change in position of the patient.

The suture of the peritoneal wound with edges.

11. The covering of all denuded areas not amenable to suture with omental grafts.

12. The use of sterile omental oil rather than the normal salt solution where denudations cannot be properly covered.

Edward L. CORRELL

Fraser J. Enteric Intussusception. *Edinb M J* 9 6 xvi, 275

Two cases are briefly reported in which intussusception occurred above the ileocecal valve, complete recovery following operation.

In both the symptoms were greatly similar showing early colic-like abdominal pain, slight nausea, increasing constipation, rising temperature and pulse-rate, with abdominal distention and rigidity. In either was the presence of blood per rectum noticed and general prostration occurred early. The age of the first was three and one half years, that of the second ten years.

In the first case the intussusception was found about ten inches above the ileocecal valve. This then was invaginated into the large bowel, the ileocecal valve remaining at its apex. In the second case, the intussusception involved about twenty inches of ileum, extending within twelve inches of the ileocecal valve.

In both cases resection of the involved ileum was performed followed by end-to-end anastomosis. In the first case recovery was complicated by acute parotitis and later by a condition resembling polymyelitis; recovery however occurred. In the second, an uneventful recovery took place.

The author emphasizes the age, the gradual onset and the absence of blood per rectum. The latter is almost diagnostic of enteric intussusception.

P. M. CHASE

Johnson, J. E. Conclusions in the Study of Intestinal Stasis. *South M J* 9 6 ix 342.

The author traces his experience with cases of intestinal stasis, beginning with the stage where the appendix alone was removed to what he terms the "blackest page of disappointment" in this endeavor, the mechanical correction of the various ptoses and kinks discovered in this condition. Finally comes the physiologic stage which offers most hope for the proper understanding of this condition.

There are three sphincters: the gastro-intestinal tract, the pylorus, the ileocecal valve and the anal sphincter. The function of the pylorus is to hold food in the stomach proper length of time—4-5 hours—for its preparation for intestinal digestion. If held longer by obstruction or spasm of the pylorus it becomes putrefied and the intestine consequently

absorbs bad food. The caecum is the cesspool of the intestinal tract. If the ileocecal valve be incompetent there is regurgitation and the patient literally feeds on his own excreta.

The author points out the effect of irritation on one of the sphincters in its relation to spasms of the sphincter higher up. The most common example is pylorospasm due to chronic appendicitis. This condition will cause a delay toxemia, the points of diagnosis of which are repeated soreness in the right side preceded by toxic headaches without colic. In advanced cases of this type there is a thickened terminal ileum and a distorted infected colon. Right-sided colectomy is the only remedy of value in such cases.

The toxemia of ileocecal regurgitation is quite different from the toxemia of delay. The former is the cause of visceroparalysis (through toxic paralysis of the planchic nerves) and the formation of inflammatory membranes due to bacterial invasion of the walls of the intestine. The cure for ileocecal regurgitation is a plastic operation described by the author in a previous paper for the re-establishment of the function of the ileocecal valve. E. FRANKLIN

Hubeny M. J. Roentgen Examination of the Appendix. *Ill M J* 9 6 xix, op.

Roentgen examination has eliminated some of the possible errors in the diagnosis of chronic appendicitis. Hubeny gives some of the confirmatory data which with the clinical findings warrant this diagnosis.

The fluoroscopic examination is the most satisfactory and visualization of the appendix is preferably made by opaque meal.

It is necessary that the appendiceal lumen be patent, otherwise the appendix may not be demonstrable.

Some observers think that every appendix which permits the entrance of an opaque meal is pathological; however if the appendix empties itself at the same time as the caecum it must not be so considered.

Adhesions are considered as pathological evidence of previous inflammations. These may be fluoroscopically recognized particularly if extensive, contractions of the structure of the lumen and other results of a diseased condition can also be demonstrated. Much information may be derived from the size and other conditions of the visualized appendix.

Since it is well known that aside from gastric ulcer chronic appendicitis is the most frequent cause of spasmodic bow glass action of the stomach, this as well as other effects on remote organs, may be looked for. H. LEE E. POTTER.

Morris, R. T. Fibroid Degeneration of the Appendix. *J M Soc N J* 9 6 viii 20

Among four well-defined types of appendicitis, fibroid degeneration appears to furnish the commonest lesion. It is an irritative lesion, not infectious. Individuals of the asthenic group presenting a

number of stigmata of decline appear to have fibroid degeneration of the appendix more frequently than do other individuals of normal development. Patients with enteroptosis and with the features of arrested development belonging to visceroptosis are prone to include symptoms of fibroid degeneration of the appendix along with their other symptoms.

The signs which belong to fibroid degeneration of the appendix, the irritative lesion, the commonest form of appendix trouble are:

1. Transitory pain and discomfort in the appendiceal region, not sufficiently severe to send the patient to bed, and extending over many years.
2. Hypersensitiveness of the right group of lumbar ganglia, determined by making deep pressure upon the abdominal wall about an inch and a half to the right of the navel and a little below that point not accompanied by similar sensitiveness of the left group of lumbar ganglia.
3. Habitual distention of the ascending colon with gas.
4. Various gastro-enteric disturbances partly due to irritative influences from the appendix and partly due to other features of neuroathenic habit or arrested development such as sagging colon, loose kidney and complications previously alluded to.

EDWARD L. CORWELL.

Dubose F. G. Neglected Appendicitis: Its High Mortality, a Diagnostic and Therapeutic Responsibility. *S. A. M. J.* 1916, 11, 332.

The unduly high death rate from appendicitis, given in reports of insurance companies as compared to the exceedingly low mortality from early operation in acute appendicitis makes it incumbent upon the physician to enlighten the laity upon the possible seriousness of what appears to be a bellyache.

Under the title pathology, the author accepts and quotes freely from the report of Stanton. All cases represent merely different stages or degrees of inflammation. The second day is considered the most serious and Dubose says: "If it is going to occur at all, gross perforation of the appendix itself with or without gangrene usually takes place before the end of the second day." Attention is called to the conclusion in Stanton reached denying the existence of catarrhal appendicitis as a pathological entity and admitting that bacteriological perforation occurs during the first few hours of the attack whether or not gross perforation of gangrene is present. Movvhan and Deaver are freely quoted as pointing to the direct connection between perforation and spreading peritonitis and pergaetion.

Under the heading symptomatology, after describing the usual well-known symptoms and signs, the author states that the differential diagnosis lies not between a late appendicitis and acute indigestion but between appendicitis and some other condition demanding surgical interference. It is only the neglected cases which demand careful judgment as to when is the best time to operate.

In coming to a decision the surgeon must always bear in mind that what has been done before he has been called and what can be done post-operatively have as much bearing on the ultimate outcome of the case as the operation itself. If a late operation is unavoidable the author advises that the stomach be emptied and kept empty, that the large bowel be cleansed with enemata and be prepared for the use of proctocolysis, that morphine in sufficient quantities be given to relieve pain, lessen peristalsis, diminish shock, retard absorption, limit tissue waste and to favor the formation of protective peritoneal adhesions, that the patient be put in Fowler's position and that proctocolysis of 15 per cent glucose and 1 per cent sodium bicarbonate and 0.5 per cent sodium chloral be given. If operative delay be unavoidable the author gives in full his reasons for never administering a purgative for withholding all nourishment by mouth and for the administration of morphine.

In case more than forty-eight hours have elapsed between the onset and the time when the surgeon is called, immediate operation is imperative. (1) If all unfavorable symptoms become exacerbated in spite of the starvation rest treatment. (2) If there be sudden relief of pain with subjective betterment but with a quickened pulse rate indicating rupture of the appendix or of an abscess or of thrombosis. (3) If a circumscribed swelling appears in the right abdomen (evidence of localization of inflammatory process by adhesions). (4) If the previously high leucocyte count fall suddenly or gradually declines with a steady increase in the polymorphonuclears. (5) When more than one week has elapsed since the onset.

Operation should be deferred from the third to the seventh day after onset long enough to give the starvation rest treatment a chance and should be deferred as long as the patient shows improvement under this treatment in the presence of a blood count which shows a high polymorphonuclear count without a corresponding leucocytosis which is indicative of intense infection or of a patient with low resistance so overwhelmed that a fatal outcome is to be expected under any treatment. The benefits derived from delay are the recovery of the sympathetic nervous system from shock, the blood is given time to form antibodies and the peritoneum is allowed to form limiting adhesions. The dangers in postponing operation are further saturation of the system with toxins, especially in the presence of a gangrenous or obstructed gut, bacterial invasion of the blood stream, lymphatic infection with resultant empyema, subphrenic abscess, multiple abscesses of the liver or cholecystitis, progressive suppurative peritonitis.

Of the factors influencing the outcome, rational pre-operative treatment is the most important in favorably influencing the result of operation. The anesthetic of choice is nitrous oxide-oxygen alone or combined with inhalation. The operation should be well planned. The author describes an

incision which he has proved to be very satisfactory. The skin is incised transversely through McBurney's point the aponeurosis and muscles are divided in the usual way and the peritoneum opened. If more room is required, the fused psoeura to the outer border of the rectus is cut and extended downward, thus permitting a triangular flap to be raised and as extensive an exploration as may be desired. Every pus pocket is opened and drained. The appendix is removed in every case where at all feasible, and thrombosed or gangrenous mesentery is likewise excised. Sheets of rubber tissue gauze, jelly covered with rubber tissue are used for drains. The author believes that too late the errors of appendicectomy result largely in mortality or conserving them due to lack of understanding of the pathology underlying the picture.

At the close of the operation hypodermolysis is given supplemented by proctoclysis. The patient is placed in Fowler's position, and morphine in sufficient quantities to relieve pain is administered hypodermatically. Stomach lavage should be used every four to six hours, and where duodenal intubation is regurgitated, the stomach contents retained by lavage are re-introduced in the proctoclysis. Essence of pepton, one teaspoonful to a quart of water is administered per rectum to relieve gas. Pilocarpin is used for dilatation after the third day, when it is first permissible to stimulate peristalsis. Milk and molasses, equal parts are the safest ingredients for an efficient purgative enemata. The routine use of strychnine, caffeine, puerari, nitroglycerine, and atropine is condemned. Morphine, atropine and pilocarpin have shown indications and are valuable when properly used. Glucose and soda administered intravenously make an ideal heart muscle stimulant besides affording nutriment and acting as acids to the elimination of toxins. The post-operative care is equally as important as the operation. I. I. McC

Andries, J. H. The Choice of Time for Operating in Acute Appendicitis and Gall Bladder Disease. *J. M. Ch. St. M. Soc.* 96 8

In acute appendicitis early operation is the best and oftentimes the only chance of cure. If the patient is not seen until the third day or later it is best to postpone operative treatment until the disease is circumscribed and localized. The danger to the life of the patient is greatest if operation is performed on the third or fourth day. After the fifth day there is no longer any danger if it is treated simply as an abscess. If pneumonia complicates acute appendicitis the outlook is poor and the condition had best be treated non-surgically until the pneumonia subsides.

Appendicitis during pregnancy is also a very grave condition, the more favorable cases being those that are operated upon during the first few hours of the attack. In every case of appendicitis in the female the physician should satisfy himself as to the

possibility of pregnancy as such a complication is always hazardous to the patient's life.

In gall-bladder disease early peritonitis is contraindicated only by the presence of some condition in another organ which would constitute a hazard to the patient's life. Early operation is not accompanied by danger provided the patient is then in good condition. Delay means courting advanced pathology and complications. Should tests of the gall-bladder be present operation is contraindicated if the temperature is above 102 except in those cases of greatly distended gall-bladder where rupture is imminent. Here all that is necessary is incision and drainage removal of the stones by any method until these circumstances become dangerous.

Thus it is seen that in both affections the choice of time for operation runs parallel, an early operation being necessary to avoid progressive pathology to lessen the difficulty and seriousness of surgical treatment and to minimize the danger to the patient's life. E. K. ARMISTEAD.

Wiener, J. Appendectomy Under Local Anesthesia. *J. Am. M. Ass.* 96 175 78

The technique which the author employs is as follows:

Half an hour before the operation the patient receives a quarter of a grain of morphine hypodermatically. A 1 per cent solution of novocaine is used to an ounce of which is added 20 drops of 1000 solution of epinephrine. As much as 240 minims of this solution can be safely used for an adult child would correspond to about 5 grains of novocaine. As a matter of fact the author has never found it necessary to use anything like that amount to do painless appendectomy.

The muscle-splitting McBurney incision is used in most cases cut as well as horizontal. This incision is particularly adapted to the peritonotomy under local anesthesia. The skin near the tensor superficialis is not very sensitive but by far the greatest advantage of an incision in this location is the fact that it comes directly out on the caecum. Rarely is it necessary to pack against the small intestines (although this can readily be done without causing pain) and there is thus less handling of the intestines. The novocaine is first injected into the skin along the line of the proposed incision. In doing this the author insists to bleach the skin with the injected solution. Then the novocaine is injected under the skin along the same line.

After a wait of three minutes the skin and subcutaneous tissues are painlessly incised down to the aponeurosis of the external oblique. A sharp scalpel is used for dividing all layers, as scissors, being blunter than a knife, are more apt to cause pain. Next novocaine is injected under the external oblique aponeurosis and after two minutes that is divided. The solution is next injected into the internal oblique muscle, parallel to the fibers of the muscle.

After another wait of a few minutes the internal oblique is cut parallel to its fibers. A little novocaine is then injected under the peritoneum and an interval of fully three minutes is allowed to elapse before dividing it. If done in this way there will be no pain up to this point. All manipulations should be as gentle as possible. It is rarely necessary to apply artery forceps in opening the abdomen through this incision which is an additional advantage as the crushing of the blood vessel with forceps may cause some pain unless the novocaine is injected around the vessel. If necessary a packing can be introduced to keep the small intestines out of the way although it is rarely necessary with this incision.

As soon as the caecum with the appendix is exposed some novocaine is injected into the mesentericolum. If this is not done the patient will complain of cramplike abdominal pain referred to the navel or put of the stomach. By anesthetizing the mesentericolum this pain is obviated. After a wait of three minutes the appendix can be pulled out of the abdomen the mesentery ligated and divided and the appendix removed with almost no pain. It is not necessary to inject novocaine into the base of the appendix before ligating and removing it. If the mesentericolum is properly anesthetized there will be no pain during the removal of the appendix. It is perfectly feasible to draw the right tube and ovary into the wound and do any operation on them that may be indicated.

The abdomen is closed layer by layer in the usual manner and if the technique has been correct the closure of the wound will be entirely painless.

EDWARD L. CORNELL.

Landman A. A. Anorectal Fistula. *A. J. M. J.* 9: 1189

The author treats anorectal fistula from the standpoint the anatomy of the pelvis and ischio-rectal fossa and maintains that the condition in practically every case is preceded by a suppurative focus which in turn originates in the bowel or any viscus between the pelvic and the retroperitoneal fascia or out on the skin surface. It is followed by a well recognized physical law and should originally be looked for in the situation where gravity and diminished resistance of the tissues militate in favor of its production. Hence internal opening of fistula is met with at the junction of the two sphincters while external opening when the bowel ruptures through any portion of the ischio-rectal space has been found in the upper perineum in the post-rotational angle of the fistula.

Abscess of the pelvic or anopercineal region results in fistula primarily because of failure to drain promptly thoroughly and efficiently or because of careless or unskillful after-treatment or both favored by natural conditions in this region which interfere with rest and cleanliness so necessary in wound repair in other situations.

It is evident from the above that the successful

operative treatment of fistula depends in a general way upon the production of favorable surgical conditions followed by suitable after-care.

Saphir J. F. Ischio-rectal Abscess from a Fish Bone. *A. J. M. J.* 9: 1194

A man aged 34 swallowed a fish bone and three days later developed boils and tenderness. He was operated upon in two weeks of ischio-rectal abscess but the fish bone was not removed. The fistulous tract returned in six weeks. At the second operation the bone was removed by the author.

The points of interest that stand out in the case and treatment of ischio-rectal abscess are as follows:

- 1 The necessity for early diagnosis.
- 2 The necessity for more frequent rectal examinations on the part of the family physician.
- 3 The necessity for complete and thorough laying open of the canal and prolonging the affected area for branch canals, pockets and foreign bodies.
- 4 The necessity for trimming out the edges of the wound to prevent bridging and to hasten healing.
- 5 The necessity for keeping the wound clean and properly drained to prevent infection.
- 6 The sphincter can be cut without causing incontinence if cut at right angles to the muscular fibers.
- 7 The ability to get along with out locking up the bowels for a week without the use of opiates and without the use of the barbarous rubber hose.

I. A. C. HILL.

Hoeve H. J. Complete Removal of the Intestinum Rectum and Colon Peritonum for Carcinoma. *A. J. M. J.* 9: 1195

The author briefly discusses the subject of carcinoma of the rectum and colon and reports a case of complete removal of these structures. He emphasizes the necessity of a thorough rectal examination in all cases showing low bowel symptoms.

The theory of Lark and Bliss that an early infectious disease due to a parasite belonging to the chytidia class a vegetable organism on the border land of the vegetable and animal kingdom is considered by Hoeve to be the most probable.

In a colon with the junction of the left colon and the sigmoid the author originally indicates the abdominal route in the removal of the rectum and sigmoid as giving better exposure and cleaner removal of all the glands and surrounding tissue usually in the abdominal cavity. In either the left iliac region or through the left rectus muscle. Contraindications for operations are metastases into the liver and involvement of the seminal vesicles, the prostate or the base of the bladder, the parietum and the ovaries in the female and parietal and omental of the upper hemorrhoidal and inferior sigmoidal arteries.

The case reported is that of a middle-aged 46-year-old man of a cruciate shape, pale, anemic, malnourished, loss of weight, weakness, general debility. On examination the tumor of

the rectum was found, extending upward from the prostate for about five inches. The mass was hard and bled easily. No enlarged glands were palpated.

Median abdominal section was performed, but no liver metastases and no glandular involvement were found, the growth being entirely extraperitoneal. The bowel was severed well above the mass, sterilized by phenol and alcohol, and closed by purse-string sutures. The rectum was freed by blunt dissection and the perirectal tissue completely removed. The rectum was then cut at the internal sphincter which was touched with phenol and alcohol. The cavity was drained through the anus by a large rubber tube. Small tube was inserted through an opening posterolateral to the anus and few strips of iodoform gauze inserted, after which the abdomen was closed.

On the third day bacillus coli infection developed which was checked by irrigation through the anal tube, but the patient died on the eighth day. No post-mortem was obtained.

The pathological diagnosis was adenocarcinoma of the rectum. P. M. CHASE

Morley, A. S. The Treatment of Hemorrhoids by Injection. *Lancet*, Lond. 9 6 10, 0 7

The obvious advantages of the treatment are (1) that the patient need not be confined to bed for more than 24 hours, at most (2) that there is no need for general or local anesthesia since the treatment is practically painless, if properly performed (3) that it can be made quite inexpensive so much so that it may be brought within the reach of even poor patients who certainly could not face the expense of an operation in a hospital (4) that it is perfectly safe procedure in such patients as the very aged, pregnant women, and others, who for some reason cannot take an anesthetic safely (5) that there is no after-pain and (6) that it is invariably harmless.

The treatment is not suited to cases of strangulated or irreducible hemorrhoids (1) cases in which there are other complicating conditions, such as old-standing fissures, fistulae, ulcers.

The treatment consists of the injection into each internal pile of a few drops of carbolic acid and glycerine. The following solution is employed:

Acid carbolic	gr. xlviii
Glycerine	dr. ii
Aquæ destillat	dr. ii

The amount which should be injected into each pile varies from 2 to 6 minims of this solution. Inject all the piles at one sitting whenever it is possible to do so. It is easiest and best in every way to perform the injection through a large speculum. The one most suitable is Kelly's sphincteroscope. The other useful appliance is a suitable syringe.

Before making the injection, the piles may be sponged over with a little weak biniodide of mercury 0.1% lycol solution, which should be mopped up

at once with a dry swab to prevent risk of absorption. It is a good plan also to touch each pile at the spot where it is proposed to inject it with a drop of pure carbolic.

The patient should be instructed to keep quiet, in bed if possible for the first 2 to 24 hours and to wash the piles at once with cold water should they prolapse and then to grease them well with vaseline or some simple ointment and gently press them back. Where the piles are large, as many as four or five injections at weekly intervals may be required but, as a rule, two or three are sufficient.

EDWARD L. CORNWELL

Edwards, F. W. The Treatment of Hemorrhoids by Injection. *Lancet*, Lond. 9 6 10, 8 9.

The author refers to the fact that Van Buren was one of the first to advise the treatment of hemorrhoids by injection. He has tried out the method in some hundred cases and seems well satisfied with the results. Except in two cases there was no pain. One injection sufficed to cure some, but the majority required two or three. It failed in one or two cases, which later required excision and ligation. He uses 30 per cent carbolic acid in equal parts of glycerine and water. Having protruded the piles, the patient is placed in the knee-elbow position and an injection of from 3 to 6 minims of the carbolic solution is made into the center of each pile. In some of the large piles he injects 5 minims in two places. The piles are then well smeared with vaseline and replaced as soon as possible, for the injection always causes the hemorrhoids to swell. Bowel movements are prevented for forty-eight hours, and should prolapse occur in the meantime, immediate replacement is necessary.

He emphasizes the importance of protruding the piles before attempting the injection and gives as his reason the following: (1) It is much easier and one is more certain of getting into the center of each pile. (2) If the piles are injected through a speculum a special long syringe is necessary whereas an ordinary hypodermic syringe suffices when the piles are protruded. (3) Piles which cannot be protruded should be left alone. They are to be cured by palliative means such as local applications, coemata, etc. (4) As to diet, regulation of the bowels, etc. (5) An assistant is almost necessary if a speculum is used, and should any bleeding occur on the withdrawal of the needle, is indispensable. He does not believe that this is as likely to take place as when the piles are protruded but it might occur when a extra pair of hands would be useful.

Cases fitted for injection are those of uncomplicated internal hemorrhoids which can be protruded, then returned and kept within the bowel, so that comparatively few cases are fitted for the injection treatment. For instance he cites cases in a day's experience in his clinic in which were complicated by other lesions 4 with fissure, 4 with external piles with an anal ulcer and 1 with a thrombosed internal pile. After the injection a few hours

in bed are advisable, after which the patient can walk about and attend to his usual occupation.

The great advantage Edwards sees in the injection treatment are (1) no confinement to bed excepting for a few hours when possible (2) no anaesthesia needed therefore there is no post-anaesthetic vomiting (3) no pain (4) no enforced absence from business (5) no risk from the little operation itself and no risk of stricture or infection following and (6) immediate and steadily increasing betterment.

As regards operative treatment he is a strong advocate of the ligature periton and cædemus the Whitehead operation. Dr. A. C. BAXTER.

Burrows W. F. and Burrows, E. C. A New Hæmorrhoidal Operation: The Snare and Bullet

J. L. M. I. I. 18

The hæmorrhoidal operation described is simple rapid and free from danger suitable for the use of local anaesthesia and has been used in a series of 60 cases.

The instruments required are a hypodermic syringe and local anaesthetic half a dozen artery forceps two pairs of scissors— one pair for cutting the wire, four or five strands of strong pliable wire— both ends of each strand threaded through a perforated lead bullet and a bullet hammer and crusher. The operation resembles most the ligature method but is cleaner more thorough and more quickly carried out than the latter. The pile can be cut away clear to the snare than the ligature and the snare and bullet finally lie at a higher level than does the ligature which the fingers must get into the anal canal to tie a procedure that is difficult.

The tissue to be removed are thoroughly anaesthetized with the local anaesthetic fluid and an incision is made below and to either side of the extra-intestinal hæmorrhoid extending into the rectum and dividing the deeper tissues in a somewhat the form of a V. A pair of forceps previously applied to the tissues to be removed is used to exert gentle traction on the parts exposing more of the rectal mucosa proper. A second pair of forceps is placed in the rectal mucosa and again traction is made in the mass and the lateral incisions are extended in order to the degree desired. About the last pair of forceps a transverse incision is made in the mucous membrane a point of some importance since it is the slit that the wire will sink and prevent slipping. A wire loop threaded through the perforated bullet and its free ends held in a clamp is then slipped over the handles of the forceps at the hæmorrhoid and then placed in position with the forceps. While the wire loop is kept taut the bullet is grasped by the bullet holder and crushed and forced down on the mucosa to either the skin or mucous side of the pedicle (preferably the latter) thus tightening the snare. The bullet forceps are released with pressure and the lead bullet made to collapse on and hold the taut wire where they pass through it securing the snare in proper

position. The excess of the lead bullet and the wires are secured by the bullet holder.

When extensive prolapse is accompanied by hæmorrhoids somewhat changed in position the same manner is used. A curved needle passes through the rectal mucosa in the hæmorrhoidal area. On half an inch of the thread is threaded through a perforated bullet which encircles the pile. The same bullet is then used so that the wire is secured and the hæmorrhoids present are removed in the same manner. Three in all will usually clear the rectum.

Most of these patients are cured but if any are not cured the operation is complicated by the fact that the hæmorrhoids remain in the rectum from the fact that the wire is not inserted.

It is not necessary to insert plugs which are used to close the wound and pain on removal of the wire is usually relieved. The operation is completed in five or ten minutes. The snare and bullet may be used on the same day but usually the interval is between the two.

E. B. L. C. ALL

Bell F. M. Bloodless Operation for Hæmorrhoids and Prolapsus Ani

The following procedure is indicated in any case in which the hæmorrhoids are indicated. After dilatation of the anus is effected at the junction of the internal and external perineal line and the rectum is exposed, a uon is made the stricture is made a triangular shape. Each side of the triangle is successively clamped the turrel is then moved to the clamp marking the stricture. The latter is placed at the apex of the triangle using silk with a Hagdon needle at both ends and the needle is as a cobbler's stitch. The triangle is then where it is used. The stricture is then cut with a pair of forceps and the free edge of the triangle is then treated with traction sutures removed. The operation has the advantage of being bloodless and less liable to complications. E. F. ARMSTRONG.

LIVER, PANCREAS AND SPLEEN

Deaver J. B. Operation for Removing the Gall Bladder

The type of operation which is recommended is described as follows. With the abdomen opened the gall bladder and right flexure of the large intestine are freed. In case there are adhesions the removal is thoroughly well off. The edge of the liver and the fundus of the gall bladder are grasped with the right hand and the

piece of moist gauze, and are pulled downward, outward and then upward, making the cystic duct and the free border of the gastropyloric omentum taut. A small incision is made through the upper part of the border of this omentum and the duct exposed. It may well be clamped at its junction with the gall bladder and cut across distal to the clamp with the canter. The common duct can readily be explored by passing a probe through the stump of the cystic duct into the duodenum. Before the probe is removed the duct is palpated between the fingers and thumb of the free hand, so that no stone is overlooked. The cystic artery lying above and to the inner side of the cystic duct is next clamped and cut. If it is not necessary to drain the common duct the stump of the cystic is ligated and next the cystic artery.

The gall bladder is freed from below upward. This is done step by step following closely with continuous suture of catgut which passes through the liver tissue forming the sides and floor of the gall-bladder bed. In this way the operation is a bloodless one and the author regards it as superior to packing with gauze or to placing a cigarette drain in the cavity left behind. The divided layers of the gastropyloric omentum are sutured, not covering in the stump of the cystic duct. A small rubber tube is placed just beyond the free border of the gastropyloric omentum and is left for four or five days. Should the stump of the cystic duct leak bile, this it may be left in place. (1920)

O'Brien, F. W. The Present Status of Gall-Stone Diagnosis by the Roentgen Ray. *Boston M & S J* 96 dec 300.

O'Brien reviews the literature, paying particular attention to the works of George and Cofe. In his own work O'Brien uses fast finely grained, intensifying screen in all gall bladder work. The advantage of employing screens is that of time as well as intensification. It is fundamental in this work that the patient should not breathe during the exposure. Stout individuals may find it difficult to hold the breath even for a second, hence the reason for speed. The screen, too, will catch more surely the markings of the so-called soft gall-stones. It is again of special value in the robust and corpulent where long exposure on an unreeled plate would give rise to so much secondary radiation that the gall-stone shadows would actually be lost to the eye.

The position of the tube will depend upon the position and size of the patient but usually it is in plane parallel to that of the patient's body. A small diaphragm and small cone are very important factors in the successful search for gall-stones.

One objection to the diaphragm and small cone is the liability to overlook stones in horizontally placed gall-bladder so that it is well not to confine the search for stones to the commonly accepted location for them. They may be found anywhere

in the lower or upper right quadrant and even to the left of the median line.

The importance of using a satisfactory developer need not be mentioned. More than that one may with advantage overdevelop certain plates while giving others their normal developing time. Plates that are too dense to be read may be reduced in that way gall-stones had we may be detected in the process of reduction that would not be likely to be found in any other way.

The plates should be read only when thoroughly dry. Direct illumination by the ribberm sky is often particularly helpful.

That experience is a tremendous asset to successful diagnosis is attested by the number of roentgenologists who under the impetus of the recent advances in gall-stone diagnosis, have gone back over their old plates of the gastro-intestinal tract and gall bladder region in which they have reported no evidence of gall-bladder calculi only to find on re-examination very definite evidence. (1920) R. BOWEN

Petersen, W., Jobling, J. W., and Eggstein, A. A. Serum Changes and the Cause of Death in Experimental Pancreatitis; Studies on Ferment Action. *J. L. P. Med.* 96 xiii 491.

Identical study of the ferment balance of the serum during various pathological conditions. The authors had occasion to observe the serum changes in a series of eighteen dogs in which an acute experimental pancreatitis had been produced.

From the series of experiments the authors believe they are justified in assuming that death was caused by the sudden flooding of the blood stream with the higher split products formed at the expense of the pancreatic tissue of which the protease in essence was a index. Except in the experiment in which they used trypsin for injection there was no increase in serum protease at any time, as would have been expected if the intoxication had been true trypsin shock, or was there much change in serum lipase (esterase) the condition in this respect resembling closely the results observed following the injection of split products.

From this study the following summary is given: The serum changes observed during acute experimental pancreatitis indicate that the shock and death are due to an intoxication from protein split products and not to an intoxication from pure tryptic ferment.

2. When the pancreatitis is produced by the injection of an antiproteolytic substance (sodium oleate) the degree of intoxication bears no relation to the degree of tissue destruction.

3. The increase in serum antiferment apparently favors the recovery. (1920) E. BELL

Levy, I. H., and Kantor, J. L. The Incidence of Visceroptosis. *Boston M & S J* 96 dec 534.

Visceroptosis, in the sense that the organs assume a lower level in the abdomen than we are in the

habit of calling normal is in the joints the authors in a large majority of congenital conditions or a reversion to the primitive type of development. Their conclusions are based on a study of 1600 patients having a ligamentous disturbance as to the hip joint referred to a routine roentgen examination. All the cases in which the ligamentous abnormality was more than one inch below the line between the iliac crests are included in the posterior classification. On this basis of the classification the percentage was 64.4 per cent had congenital. The condition was slightly more frequent in men than in women and in individuals under forty years than over that age in both

males and females. It occurred more often in single than in married women, and was associated with ptosis of the other viscera, the chest and abdomen in varying degrees in many of the cases.

Improper garments, occurrence of pregnancy or any other incidental causes play no part or at most only a very minor one in the production of the condition. The authors hold that it is intimately related to the structure of the body and probably arises from some congenital predisposition. Ptosis in itself is not a disease. Mild degrees of it may be under certain circumstances cause symptoms, whereas marked types need not necessarily impair the functions of the affected organs. A. HARTMAN.

SURGERY OF THE EXTREMITIES

DISEASES OF THE BONES, JOINTS, MUSCLES, TENDONS, CONDITIONS COMMONLY FOUND IN THE EXTREMITIES

Henderson M. S.: Loose Bodies in the Knee-Joint. *Am. J. Orth. Surg.* Rochester 1906.

The author classifies loose bodies in the knee joint as follows:

1. Fibrous loose bodies intrinsic in origin.
2. Bodies composed of organized connective tissue of bone and cartilage intrinsic in origin.
3. Loose foreign bodies extrinsic in origin.

He recommends that in the operation the most rigid asepsis be observed and usually a general anesthetic is necessary. The incision may be laterally on either side or the patella may be split. The condylar incision is better for the removal of the meniscus. If the body is in the posterior part of the joint the incision described by Brackley and Osgood is the best. If the body eludes the surgeon a second attempt at a lateral incision is better than a too prolonged scarring.

The author's conclusions are as follows:

Fibrous loose bodies are due to some disease condition of the joint and do not cause mechanical derangements.

Organized connective tissue loose bodies produce mechanical derangement.

Loose bodies may have as their primary cause some condition such as osteoarthritis or Charcot's disease, but the secondary cause is direct or indirect trauma.

Orthopedic treatment alone is a group more or less distinct from the rest. The bodies seem to be produced by very slight indirect trauma.

Trauma direct or indirect is essential to the production of a loose body.

Surgery offers the only permanent relief and the general condition of the patient being satisfactory the bodies should be removed.

PHILIP LEWIS.

Young J. K.: A Case of Arrested Development of the Carpus and Tarsus. *J. J. K. S.* 1916.

The author was unable to find a recorded case of bilateral club-foot and club hand due to arrested development or from congenital absence of bony structures.

He reports a case of a ten year-old girl with the condition in which he thinks the arrest of development as probably caused by some acute infection general in character but its exact nature unknown. PHILIP LEWIS.

FRACTURES AND DISLOCATIONS

Skilern P. G. Jr.: The Diagnosis of Fracture by Physical Examination Versus Skiagraphy. *Intern. M. J.* 1916.

By obtaining a careful history of the mechanism of the injury and by a brief and gentle physical examination with the elicitation of true guarding, tenderness, the diagnosis of fracture can be established in the great majority of cases without the aid of a skiagram.

The chief value of a skiagram consists in checking the extent of the deformity. A skiagram must be considered merely as one of the many signs of fracture.

It is more difficult to diagnose contusion and sprain than to diagnose fracture. Such diagnoses are often but cloaks to cover hasty and incomplete physical examinations and should presuppose negative results following the exhaustion of every means at command to prove the presence of fracture. F. D. DICKSON.

Ellenby G. F.: The Fracture Problem. *North. M. J.* 1916.

The author in this general paper calls attention to the seriousness of every fracture. He lays stress upon proper alignment and its relation to function. Between the open and closed methods

of treatment he thinks there is a happy medium. H advises the open treatment in fractures of both bones of the leg, the arm with irreducible overriding fracture of the femur with overriding fracture of the patella and most fractures of the olecranon. If there is no infection, operation is indicated at once. Massage and manipulation should be begun at once in the closed, and after few days in the open, operative treatment. In compound fractures he operates at once. In ununited fractures the bone-graft is recommended.

E. B. MURKIN

Rosenzweig, S. B. The Causes of Prolonged Disability from Fractures. *V F M J* 9 6, 401, 440

Rosenzweig urges that as much care be given to the prevention of prolonged disability after fractures as is given to the various operative procedures used in their reduction.

The causes of prolonged disability may be general or local. The general causes are less frequent. Among the most important are cachexias, as in tuberculosis and malignancy and the severe anemias, circulatory disturbances, as in cardiorrenal or hepatic diseases, nervous disorders, as in tabes, paresis, or myelitis. Old age is also important.

The local causes are divided into three groups: (1) amount of bone injury and damage to soft parts, (2) the sequelae of poor reduction, malunion, delayed fibrous union and non-union, and excess of callus and its results, (3) the result of insufficient or improper care such as pressure ulcers, muscular atrophy, ischemic contracture and adhesions within the joints and tendon sheaths.

LLOYD T. BROWN

Henderson M. S. The Transplantation of Bone in Ununited Fractures of the Shaft of the Humerus. *A m. Surg. Phila* 9 6 441, 464.

Henderson reports 10 cases of ununited fracture of the shaft of the humerus operated upon at the Mayo Clinic, with the following results. In 4 cases union was obtained at the first operation, in 3 a second was necessary, in 3 no data could be obtained as to the final results, and in one no union is known to have occurred. In 7 cases there was primary musculospiral paralysis produced at the time fracture occurred. In one no attempt to trace the nerve was made. In the other the severed ends were encased in fascial tube made from the fascia lata, the operation being too recent to state the result. One case developed the same kind of paralysis at the time of operation from too vigorous retraction, but at the end of one year full function was restored.

H arrives at the following conclusions:

1. The transplant must be as large as is practical (6 inches by one half inch or larger). It must extend well past the thinned decalcified ends into the hard healthy bone beyond.

2. The inlay is the method of choice.

3. Adequate post-operative fixation is necessary. A split plaster-of-Paris spica prepared a few days before operation can be fastened on with adhesive strips immediately after the operation is completed thus eliminating the difficulty of applying the spica and the danger of disturbing the graft thereby. Two or three weeks later when the wound has healed and the stitches have been removed, a new cast can be applied carefully with the patient sitting up.

4. By removing the bone-graft from the internal, flat surface of the tibia the strong crest of the bone is left to perform its important weight bearing function. The patient may be allowed to walk in from 1 to 4 days and by this time the blood-clot filling in the bony defect has become sufficiently organized so that no hemorrhages will occur when the leg is used.

5. A properly applied spica cast may be comfortably worn for 3 months when in all probability union will be complete.

R. S. BROWNE

Hawley G. W. A New Method of Fracture Fixation. *Intern M J* 9 6 441, 7

Hawley describes a method of clamping oblique or transverse fractures by means of wire in such a way that the wire may be withdrawn from the wound whenever desired without disturbing the fixation or making a fresh incision.

The instrument consists of a long slender bar a loop of heavy woven bronze or ordinary picture wire attached to a sliding clock and thumb-screw. The wire loop is designed to encircle the bone and engage the end of the bar to form a false knot. By turning the thumb-screw in one direction the loop can be tightened, and by turning in the other direction the loop is released and withdrawn. For application the fracture is exposed in the usual way and the apparatus applied after reduction of the fragments the wound is then closed leaving the bar protruding and dressings and a plaster cast are applied. The clamp may be left on as long as desired and withdrawn by loosening the loop and allowing it to slip off the end of the bar.

From experience in 7 cases the author concludes that the instrument has its field of usefulness in fractures where there is much tendency to displacement. A few cases have become infected, but only in a mild degree, and healing was without incident.

F. D. DICKSON

Simmonds, B. S. A Method of Treating Gunshot Fractures by an External Fixation Apparatus. *Brit J M* 9 6 448

The author describes an apparatus for holding in position the fragments in compound fractures. By means of an aseptic operation he inserts into the bones at a distance from the seat of the fracture screws which are long enough to project well beyond the skin and to immobilize the fragments by

means of a rigid plate fixed to the screws by nuts the entire operation being done without interfering with the original wound.

The advantages of the method are (1) the apparatus is simple and inexpensive (2) the operation is simple and easily performed (3) the original wound is not interfered with and healthy tissues are not extensively opened.

LLOYD T. BROWN

SURGERY OF THE BONES JOINTS ETC

Cotton I. and Mann G. A Further Study of Bone Repair. *S. Ark J. Med.* 9 6 15

The authors give a report of studies in bone repair from experiments done within the last two and a half years. The literature since 1913 is reviewed and grouped into two schools: one in which claims are made that periosteum makes bone and the other in which claims are made that periosteum plays no rôle in new bone formation. The conclusion from the study is that the periosteum is a means of protection against infection, a source of added blood supply, a limiting membrane and its presence favors an earlier repair of defects, but the healing in its absence is bony nevertheless.

The authors found that free transplants of periosteum in the anterior chamber of a cat's eye did not live and produce bone. Free periosteum wrapped around the carotid artery showed no growth of bone. Resections of the tibia subperiosteally leaving the closed periosteal tube behind gave no regeneration of the tibia from the periosteal sheath. The authors give a summary of the literature up to date in regard to callus formation. In 19 fracture experiments where the tibiae in the same animal were broken simultaneously, one leg having the periosteum removed first and one having the periosteum remaining intact showed repair in both cases. In the bone from which the periosteum had been removed the callus formation seemed to be greater than in the other, but not so far advanced in its development up to 30 days after the experiment started. A series of experiments where a tibia was trephined from the bone subperiosteally and the periosteum sutured back into place again in contrast to a case where the same operation was done but the periosteum was removed, showed that new bone was formed in each instance similarly, namely, that it seemed to spring from the medullary part of the bone working toward the surface, only in the case where the periosteum was not removed the repair was much greater in extent. In regard to the use of small free bone transplants uncovered by periosteum the authors state that sooner or later these perish.

In regard to intramedullary transplants the authors think that although osteogenesis on the part of the recipient bone is stimulated, yet the ultimate fate of the transplant is death. Protocols of the experiments with the appropriate bibliography are given in the original article.

Campbell W. C. General Heliotherapy in the Treatment of Bone and Joint Affections. *Am. J. Orth. S.* 9 6 15

The author used the sun treatment in 8 cases in 8 of which sufficient time had not elapsed to obtain results. Of 4 with histologic improvement was rapid in 3, but for various reasons exposures could not be continued. Of the remaining 4 in which treatment was satisfactorily given, 1 was tubercular, 4 osteomyelitis, 2 pneumocele, 1 arthritis, 1 peri-arthritis following direct infection of the knee joint, 1 arthritis deformans, 1 decubitus.

He concludes:

1. That there is rapid expulsion of sequestra.
2. That there is marked and early beneficial effect in severe septic conditions.
3. That there is rapid resolution of the tubercular process resulting in bony ankylosis in every case.
4. That there is much difficulty in having the exposures regularly given in well-regulated general hospitals.

5. That close attention should be given to orthopedic measures for the prevention of the deformity as in any previous treatment by using removable apparatus and extension.

6. That a decided advantage has been made not only in the treatment of surgical tuberculosis but in certain other affections of bones and joints.

THOMAS L. LIND

Roberts P. W. The Influence of the Os Calcis on the Production and Correction of Valgus Deformities of the Foot. *Am. J. Orth. S.* Washington 9 6 15

In this paper attention is called to the importance of the os calcis as a basic factor in the cause of valgus deformities of the foot and as a medium through which weak foot and moderate paralytic valgus can be controlled. The observations are based upon the principle that a body with an arc for its base can support a superimposed weight without tilting only when the thrust of that weight is received over the center of balance. It is shown that the under bearing surface of the os calcis is on cross-section of the bone at its point of contact with a plane surface an arc and is therefore subject to the law just cited. It is further demonstrated that because of the firm ligamentous union of the os calcis to the rest of the foot any rotation of the heel bone must alter the strain on the longitudinal arch raising it if the superior surface of the os calcis is rotated outward and depressing it if rotated inward. Therefore by means of a plate designed for the purpose weak foot and moderate paralytic valgus may be controlled without any prosthesis whatever under the arch. The same principle is applied in the surgical treatment of acquired varus.

Lord J. P. Arthroplasty of the Interphalangeal Joints. *Am. J. Orth. S.* 9 6

The author used free fat and fascia from the fascia lata to relieve some cases of stiffening and

some with congenitally contracted and pathologically dislocated fingers. He usually employed 400 novocaine locally and a tourniquet. It is necessary to control bleeding thoroughly before transplants are placed and the wound closed.

While his results were somewhat disappointing in the interphalangeal joints of the fingers the majority of the joints were greatly improved, some to the extent that the patients were satisfied because the fingers became usable whereas before they were almost useless.

Free full motion was obtained in none of the cases. Some joints, with a chronic arthritis, lingering and somewhat painful before operation, became painless afterward.

PHILIP LEWIS

Tarnowsky G. d. The Heterogenous Bone-Peg: Its Possibilities and Limitations. Surg. G. & O. Abst. 9 6 222, 6

In view of the present well generalized belief that all bony transplants are ultimately absorbed, the author was led to try sterile intramedullary pegs derived from the long bones of cattle. Sufficient time has not yet elapsed to permit of a positive statement regarding the exact interval which must elapse between the implantation and final absorption of the peg, but serial skiagraphs of operated cases show the bone to be slowly absorbing. Clinically the results have, in the main, been good. The callus while tending to be excessive has been firm and primary union has been obtained in all but one case.

The distinct advantages of the soup-bone pegs are (1) they are easily obtainable (2) they can be sawed or chiseled into any length or thickness (3) they are easily sterilized (4) they do not become brittle even after repeated boiling. The pegs are especially indicated in transverse or slightly oblique fractures as well as in fractures of the neck of the humerus or femur. They are less satisfactory in markedly oblique fractures or fractures with considerable splintering of the shaft.

Soule, R. E. The Use of the Autogenous Bone-Graft Pin in the Treatment of Painful Flat Foot Paralytic Valgus, etc. T. Am. Orth. Ass. Washington, 9 6, 31

In his paper read before the American Orthopedic Association in Washington in May 1916 Soule gives his observations from experience gathered in his investigations of painful foot disability over an extended period in orthopedic practice and emphasizes the fact that in acquired deformities of the foot the astragalus is seldom if ever displaced laterally. From his findings he has applied a new method of treatment to correct deformity and relieve painful disability which is applicable to a very large percentage of the conditions. He cites 33 cases operated on giving numerous illustrations of his cases before and after treatment, including painful pronated flat foot paralytic valgus fracture displacement of the tarsus, and osteo-arthritis where

he has applied arthrodesis of the astragaloscaphoid joint and autogenous bone-graft pinning of these bones with extremely satisfactory results.

The indications for this method of operating in flat-foot are

1 Where the methods have failed to restore the foot to full function, painlessness, and normal contour after reasonable trials and a relapse toward the original deformity takes place

2 Where bony prominences of the tarsus preclude the use of the rigid flat foot plate and where pronation of the foot is predominating part of the deformity found in cases of relaxed pronated weak feet

3 In cases of pronation of the foot with depression of the longitudinal arch as result of fracture of the scaphoid or astragalus or displacement of the scaphoid

4 In cases of pronation and valgus of the foot following a flat paralytic valgus with anterior and posterior talar muscles in similar position to the scaphoid

5 In cases of osteo-arthritis of the foot where the predominance of pain is associated with the mid tarsal joint with or without valgus pronation.

The technique of the ortho operation is as follows. With the foot in a leg prepared for operation preferably by the iodine method and a tourniquet applied above the knee an incision two and a half to three inches long is made on the dorsum of the foot along the inner border of the tendon of the anterior talar muscle from the bend of the instep. At the distal end of this incision it is curved inward and downward to expose the inner prominence of the scaphoid through which the bone-pin is to be inserted.

Through this incision the dorsum of the foot the entire width of the astragaloscaphoid articulation is exposed.

The articular connecting ligaments of the entire width of the anterior area of the joint are dissected away and the forefoot is freed downward to expose freely the articular surfaces.

With the author's double curved gouge made to fit the ovoid of the head of the astragalus the corresponding concavity of the scaphoid the entire articular cartilage is easily removed from both surfaces, preserving the ovoid of the head of the astragalus and the corresponding concavity of the scaphoid thus assuring greater area for bony contact and accuracy of relation of the two bones in position.

With the forefoot freed into a normal position and held by an assistant securely in proper adduction a hole three sixteenth to one-fourth inch in diameter is made with the motor drill through the inner extremity of the scaphoid from before backward obliquely outward and upward into the head of the astragalus to sufficient depth, one and one-half to two inches, to securely lock the scaphoid to the astragalus. The drill is disengaged from the motor and left in position in the drilled hole. A strip

of cortical bone is next removed from the crest of the tibia sufficiently thick to form the dowel peg of the same size as the drill used. This can be done with a chisel but preferably with the single or twin motor saw. When shaped in the dowel shaper it is ready to be substituted for the drill which has been left in position in the hole drilled through the scaphoid into the astragalus. The loof is introduced into the bed immediately the drill withdrawn the foot being held firmly and steadily in its correct position by an assistant during the withdrawal of the drill and the introduction of the loof pin which is driven home by a tap of the mallet. The excess length of the pin is cut off with forceps or the motor saw flush with the bone surface.

The skin wound in the leg and foot are closed with suitable suture material. Drainage dressings are applied and plaster of Paris cast put on from the toes to the knee with the foot at a right angle.

Convalescence is uneventful. The patient is up out of bed in a chair with foot and leg in a horizontal position in three or four days. At the end of two weeks he can be up on crutches for intervals during the day at a single foot is operated. At the end of six weeks the cast is removed and massage, active exercise and weight bearing is begun. At the end of eight weeks in the author's experience full weight bearing can be all well.

The advantages of the operation are

1 The period of treatment is greatly shortened.

There is no possibility of a relapse to the former condition and position.

3 A strong, painless, stable foot is the result.

4 There is no diminution of the necessary function of the foot.

5 There is no need of relief from the torture and annoyance of wearing flat foot arch supports or other external supporting braces or specially constructed shoes.

6 The operation is applicable to cases much younger than could heretofore be treated by any other technique procedure.

The technique is simple definite and accurate.

Level D Transplantation of Tissue Level 1

The author believes that the autoplasmic graft is the most successful of the skin transplants. He believes that in bone-grafting the ideal graft is one containing enough compact bone to lend support and fixation when required and not sufficient to cause cellular death hence he prefers the anteromedial surface of the tibia for grafting purposes that the compact bone of a graft is gradually absorbed to be replaced by the periosteum and the endosteum that bone-grafts placed in cavities following curettage of giant-cell sarcoma or fibrous osteitis do not live because of the bleeding into the cavity thereby preventing vascularization that bone transplanted into infected areas lives and reacts to the infection like normal bone and that the inlay graft gives

better results than the intramedullary splint in ununited fractures.

He describes in detail the technique of amputation as performed by M. Arthur upon nine patients. In this case the extremities of the forearm were torn and resected and transplanted strips of tibia which had previously covered a laceration of the tibia.

He believes that the use of the autoplasmic graft or of a replacement of the tibia by a prosthesis upon the early fixation of the fragments is a better method.

Levi and Kirk believe that the use of the autoplasmic graft is fully justified in the treatment of the tibia which is badly injured and that the use of the autoplasmic graft cannot be cured.

Watson C. G. Amputations at Base Hospitals in France

The author explains the reasons for the use of the autoplasmic graft in the method of Amputation and the present war. The method of amputation in all amputations are

1 To keep the patient comfortable and after the operation.

2 To permit an operation which is the spread of the infective gangrene and the epidemic.

3 To save as much limb as possible. The disadvantages of the flap method are

1 There will be less chance of a patient losing his life at the time of amputation, saving the patient's life because there will be less chance of checking infection.

2 There will be more chance of the patient losing his life at the time of amputation.

3 For the amputation to succeed it will have to be performed as high as or higher in the limb than the second stage of a primary flap amputation.

4 Healing by first intention cannot be expected (The cases must be seen to appreciate this).

5 The risk of secondary hemorrhage is a very grave danger in these cases is greatly increased. Since the routine adoption of the flap method the author states that not a single case has been lost from secondary hemorrhage following amputation in the hospital he is connected with. The only death in their hospital from secondary hemorrhage after amputation, during the last six months occurred in a case operated on near the front by the flap method. Secondary hemorrhage occurred during transport and again after admission to the hospital.

6 The need for reamputation for epistaxis or hemorrhage may be expected at a time when the patient is unable to stand further operation and often when there is not enough limb available for an amputation.

The advantages of the autoplasmic method are

1 Rapidity with minimum shock.

2 A plain open surface for dressing which is

favorable to the subsequent control of sepsis and which prevents pocketing.

3 Great diminution in the risk of secondary hemorrhage.

4 The operation provides the best mechanical relief of gas tension by dividing all the tissues at right angles to the muscle planes.

5 It allows a temporary amputation to be performed close to the site of the injury so that a permanent amputation can be performed later (when sepsis is under control) a little above the injured area.

6 In cases associated with fracture the proximal end of the bone can be and should be left intact (that is not sawed through) and projecting beyond the plane of muscle-section thus minimizing the risks of osteomyelitis and also providing a useful medium for the application of pressure by means of dressing in case of hemorrhage (a practical point of great value) for moving and fixing the limb and (3) for the application of extension to the skin.

The fluke circular method may be modified, according to circumstances by single flap cut from the damaged area and turned back, thus saving

few inches of bone in the final result although this flap is liable to slough owing to anaerobic or streptococcal infection.

The author lays stress on the after treatment of the flapless amputation. At the secondary operation it is important not to open up muscle planes because of the danger of flare-ups. The muscles attached to the bone should be carefully separated from the periosteum by snipping with scissors until the amount of bone required to be removed has been bared. If the bone is divided without lacerating the granulation tissue the operation can be done without any local or general caction. The periosteum should not be stripped back from the bone otherwise new bone will be thrown out in the muscles.

During the interval between the first and second operation the limb should be kept stretched by means of an extension. The second operation can and should be performed before any serious cicatricial contraction has occurred. In several instances a completely healed and comfortable stump has been secured within a month of the original amputation.

LLOYD T. BROWN

Kelly, M. F. The Flapless Amputation. *Br J Surg* 9 6 111, 676.

The author strongly advocates the flapless method of amputation: (1) gaseous gangrene (2) compound comminuted fracture and (3) multiple wounds.

The author summarizes the advantages of the method as follows: (1) it saves life (2) as the length of limb (3) lessens the risk of secondary hemorrhage (4) arrests the spread of infection whereas in flap amputation sepsis often recurs in the flap and spreads up from there.

The amputation is done as follows. The skin and deep fascia are divided usually by a circular incision.

After retraction has occurred the muscles are divided at the level of the retracted skin—not too quickly to allow retraction of the layers then the bone is sawed off flush with the muscles the vessels are secured and nerves properly shortened. Retraction is easily overcome by extension once the face of the wound is clean.

The method enables the amputation to be done close up to the involved area and would seem a rational procedure under conditions which exist at the front.

F. D. DICKSON.

Bryan, C. W. G. The After Treatment of Amputation Stumps. *Brit Med J* 9 6 1, 480.

The author describes an apparatus for making traction on the skin and soft parts after amputation of either the flap or the flapless variety. It consists of longitudinal strips of two inch adhesive strapping applied to the amputation stump from the joint above to about an inch from the edges of the wound and then prolonged about twelve inches beyond the edge of the stump. These strips are attached to an aluminum ring eighteen inches in diameter. This ring is attached by three pieces of cord tied to it at equal distances from one another the cords passing through pulleys hooked to a Balkan splint to which an extra crossbar of wood has been bolted. The free ends of the cord are tied together and the weights are hooked on. For a thigh amputation a weight of about eight pounds is used, while for the arm about five pounds suffices.

LEON T. BROWN.

ORTHOPEDICS IN GENERAL

R. Harris, P. W. Paralytic Feet. *Br J Med J* 9 6, 111, 820.

The operation proposed applies to practically all forms of paralytic feet where there is instability of the ankle. It is neither so radical as complete astraglectomy nor so certain as arthrodesis. The mechanical problem presented in cases of instability of the ankle following paralysis is the restriction of anteroposterior motion at the tibioastragalar joint and lateral motion between the os calcis and astragalus. Control of either of these joints without control of the other will yield imperfect results therefore it is necessary that both be included in any plan to stabilize the foot. If movement of the ankle joint is obliterated, there will still be enough anteroposterior motion between the os calcis and the astragalus and between the head of the astragalus and the scaphoid to maintain a considerable degree of elasticity in the foot. Hence the operation under consideration aims to efface the astragalocalcaneal joint and to drop the external malleolus down sufficiently to overlap the os calcis, thus blocking lateral motion between this bone and the astragalus. Through a fishhook incision, such as is commonly used for astraglectomy the astragalus is exposed and dislocated from the mortise formed by the lower end of the tibia and

Jones, R. Positions of Election for Ankylosis Following Gunshot Injuries of Joints. *Brit M J* 9 6 1, 609

The author discusses the position of election for the various joints as follows:

In the shoulder joint the arm should be abducted at about 5°. The elbow should be slightly in front of the coronal plane of the body so that when it is in a right angle and the forearm supinated the palm of the hand is toward the face.

As to the elbow joint the majority of men are better off with the arm at 90°. In cases in which both elbows are involved, one should be fixed at 80° and the other at 100°.

In the forearm if the movement of pronation and supination are lost the radius should be fixed midway between pronation and supination.

All injuries of the wrist joint should be treated with the wrist dorsiflexed.

In the hip-joint ankylosis should be encouraged in a position of very slight abduction with thigh extended and very slight outward rotation.

The knee should be fixed in an extended position. In injuries of the ankle the foot should be kept at a right angle with the leg, so that the sole impinges on the ground in a lightly arched rather than a valgus position.

In answer to the question: What should be done with a flail joint? Jones says: Secure by operation an ankylosis in the most useful position.

The only exception is the hip-joint where by means of simple mechanism a very useful limb may be obtained in spite of the joint being flail.

PHILIP LEWIS

SURGERY OF THE SPINAL COLUMN AND CORD

Hassin, G. B., Johnstone, K. L., and Carr, A. M. Bullet Lesion of Cauda Equina. *J Am M Ass* 9 6 1, 111, 100

The patient, a man of 28, complained of pain in the left lower extremity. The pain would jump from the left buttock to the left popliteal region, whence it would reach the left little toe and spread over the foot and the other toes. It would stop for about five or ten minutes and then begin again. He could not sleep nights; could not rest in the daytime, and could not do his work (that of a watchman) but he was able to walk.

The pain originated six years previously after he had been shot in the back. One attempt to remove the bullet, four hours after he was shot, was entirely unsuccessful. Following the shooting, the patient immediately became paralyzed in both lower extremities. The paralysis was combined with anesthesia and loss of sphincter control. A month later cystitis developed which persisted for two years. He could not move around for two years and had to be carried all this time in a rocker. The symptoms plainly indicated involvement of some of the motor and sensory roots of the cauda equina that supply the lower limbs with motion and sensation.

A curved incision was made from the first lumbar to the first sacral spinous process. The spinous processes of the second, third, and fourth lumbar vertebrae were exposed and removed. The laminae of the same vertebrae were removed and the dura exposed. The dura was split and dissected free from adhesions to the cauda. The bullet was found at the level of the third lumbar vertebra, surrounded by two solid scars. It was carefully dissected with blunt dissectors and removed. The slightest possible injury to the surrounding tissues was carefully avoided.

The operation was followed by numbness in the

gluteal buttocks, about the anus, and by retention of urine for about six days. Four weeks after the operation the wound cleaned up and for about seven weeks there still was severe pain in the legs, which, however, was gradually disappearing and the patient was getting nearer his feet. Ten months after the operation the pain disappeared entirely; the gait became practically normal, the calf muscles increased in volume one inch, the pain sensation was found to be normal—but only the right leg—while in other cases the sensibility showed the same disturbances as before the operation. No changes were found in the reflexes, or in the muscle power. The improvement was so marked that the patient insisted on leaving the hospital and fitting to resume work.

LEONARD L. CORNWELL

Kleinberg, S. Congenital Anterior Curvature of the Spine. *J Am M Ass* 123 9 6, 1, 30

The author describes a case of true congenital lordosis of the spine or associated with any other deformity.

The case is described in some detail as to X-ray and laboratory findings. His conclusions are that this was an instance of congenital lordosis in which he believes heredity played a part and despite the marked lordosis there was no abnormality.

C. C. CHITTENDEN

Armour, D. Gunshot Wounds of the Spine. Their Surgical Aspect. *Lancet* Lond 9 6 1, 110, 770.

The author divides gunshot wounds of the spine into two classes: (1) those in which there is interference with the function of the spinal cord; (2) those in which there is more or less interference with the function of the spinal cord with or without obvious injury to the vertebral column.

Injury to the vertebral column may be followed later by effects of inflammatory products adhesions narrowing of the spinal canal intra or extradural clot etc.

Immediate injury to the cord may be caused by (1) the missile passing through part or the whole of the cord (2) fractured bone causing compression contusion laceration, or complete division (3) concussion.

The author has found the X ray to have only confirmatory value in localizing bone injury and foreign body position.

The points of importance arising regarding operative intervention are (1) Will any benefit to the patient result from the operation? (2) Will his life be endangered by the operation? (3) Will he be made worse by operation?

The author then discusses indications for operation and urges interference under proper surgical skill and asepsis in all cases in which complete section has not taken place, providing the patient is in a fair general condition. He says: "It is unfair to the patient and unfair to surgery to wait on and on till hope gives place to despair and then call in a surgeon as a last resort to perform the impossible."

Operation is therefore indicated (1) to relieve pressure from depressed or displaced fragments of bone (2) to relieve pressure from blood-clot or from extensive hemorrhage, either extra or intradural (3) to relieve pressure and prevent further destruction from oedema by enlarging the constricted bony canal (4) to remove the danger of pressure from exudate and inflammatory thickening.

H. W. MEYERDING

Collier, J. Gunshot Wounds and Injuries of the Spinal Cord. *Lancet* Lond. 9.6.17

Eighteen months service has given the author an excellent opportunity to study gunshot wounds and injuries to the spinal cord. The nature of lesions caused by high velocity bullets shrapnel fragments of shell casing and by the concussion of high explosives without any external wound are

1. Direct lesions—missile through cord
2. Indirect lesions (a) those due to an in-driving of bone etc. into the spinal canal (b) Impact lesions where the missile strikes against the bony wall of the spinal canal (c) concussion lesions from the shock of high explosives
3. Secondary lesions: perithecral and intrathecal hemorrhage medullary hemorrhage and thrombosis menigitis oedema (may come late and cause in certain symptoms)
4. Remote lesions which may be found anywhere in the spinal cord and chiefly near the surface spot of necrosis sieve like rarefaction punctiform hemorrhages oedema swelling of axons. These result from passage of a missile through the cord or from concussion suddenly raising pressure.

Case history illustrating the above lesions are cited. Especially interesting are those resulting

from concussion and to shell bursting near the patient without external wound yet producing severe local transverse lesions of the cord.

Root lesions are produced by projectiles directly or indirectly the latter from subperiosteal hemorrhage perithecral swelling or pachymeningeal hemorrhage.

Intrathecal hemorrhage is discussed and the difficulty of explaining the physical signs unless this condition is borne in mind is shown by case history.

A case is cited of total necrosis of the distal segment of the spinal cord at autopsy in a case without sign of hemorrhage or septic process three months after injury which had produced a total transverse lesion at the third dorsal segment.

The author discusses reflex actions contra tures disturbances of sensibility and the distinction between root lesions and central lesions and prognostic indications.

H. W. MEYERDING

Hull, A. J.: Treatment of Gunshot Wounds of the Spine. *Bull. M. J.* 9.6.17

To be successful spinal operations must be performed at an early stage before any vital changes have occurred in the cord. By delaying operative interference cases lose their chance of recovery either by the sepsis spreading or by pressure on the nerve tissue causing these vital changes to take place.

It would appear justifiable to operate upon spinal injuries when the X ray localisation shows a foreign body present in an accessible position and especially when there is evidence of some remaining conductivity of the cord as here the removal of pressure may be followed by great improvement. Pain in some spinal lesions is so intense that an operation is justifiable whatever the lesion of the cord.

Three lines of treatment are indicated: (1) prevention of sepsis, (2) removal of gross pressure upon the spine and (3) the prevention of complications which threaten life.

R. B. CORRIE

Sayre, R. H. The Occurrence of Late Rickets. *The New York Times* Wash. 9.6.17

Rickets occurring in adolescents and adults is less uncommon than has been supposed. Its occurrence abroad has been much more frequently noticed than in this country. Apparently rickets in the adolescent is frequently of the recrudescence variety and in a number of the author's cases the patients have been subjected to various operations for the relief of the deformity earlier in life but no effort having been made to eliminate the underlying cause of the softening of the bones the deformities had recurred or else deformities of an equally disabling character had taken their place requiring further operative intervention.

In one case a girl 10 years of age who had had four previous operations before coming under observation the femora were so soft that the osteo-

t me ent through at the first blow when a supra-condylloid operation was done but six months later after the patient had been fed upon phosphorus and cod-liver oil, the edge of the chisel was broken off while an operation was being performed upon the shaft of the femur to correct twist there and a second instrument was used to complete the operation.

In the case of a boy 6 years of age, marked knock-knee had developed in the space of three months, and reasoning that if the bones were sufficiently soft to create so marked a deformity in so short a time, pressure could correct the position, the legs were put in plaster-of-Paris bandages, which were subsequently sawed through at the point of deformity and wedged straight, a perfect result being secured without the necessity of breaking the bones. This boy was placed on phosphorus and cod-liver oil, and remained straight. These cases emphasize the necessity of attending to the underlying cause

producing the softness of the bones as well as merely correcting the deformity.

Shackleton W. L. Some of the Surgical Aspects of Painful Back. *J Am. M. Ass.* 9 6 1911, 600.

Shackleton describes an anatomic variation of the transverse process of the fifth lumbar vertebra the lumbar rib and he cites three unmistakable cases, two of which when operated upon were entirely relieved. The condition arises in middle adult life after years of hard labor but may also follow fracture, or some infection. The backache seems to be due to impingement of the process on the ilium sometimes thus separating the sacro-iliac joint, or to impingement on the nerve itself. The fifth lumbar nerve seems to be the branch most commonly affected, causing most marked motor symptoms in the peroneal nerve. In the two cases reported, the prolonged processes were removed and instant relief occurred.

R. G. P. CHARD.

SURGERY OF THE NERVOUS SYSTEM

Bucholtz, C. H. Partial Resection of the 31st Nerve in Spastic Paralysis. *T. Am. Orth. Ass.* Washington, 9 6 May.

In spastic paralysis the restoration of the function of the paralyzed limbs demands long continued re-education and exercise treatment. A greatly defective balance and actual contracture may make rational exercise difficult if not impossible and may require surgical interference.

Until recently operations on the tendons and muscles were practically the only operative procedures in use in these cases but within the last two years operations on the nervous system directly have been done in various ways. Among these operations may be mentioned the following:

1. Resection of the posterior roots of the spinal cord (Foerster's operation).

2. Operations to cause temporary paralysis by the injection of alcohol into the nerve trunks (Allison's method).

3. Partial resection of the motor nerves (frequently called Stöfel's operation).

Although the last-mentioned method has at times been used it was through Stöfel's anatomical studies and clinical work that the method has been so thoroughly developed. Stöfel has shown that in the cross-section of the nerve trunk the arrangement of the single bundles is practically the same in every person, so that anyone familiar with the anatomy of the cross-section will find without difficulty at a given place that bundle for which he is looking.

Stöfel's operation consists in a partial resection of the motor supply of the spastic muscles either

after the motor branches have left the main trunk, or within the main trunk itself. The latter method is used only when the former is rendered difficult or impossible by the anatomical conditions.

Stöfel's operation is in the author's opinion indicated in all cases of rather localized spasm with markedly defective balance which is not showing any improvement and no response to treatment.

The contra-indications are as follows:

1. The progressive character of the disease causing the spasticity.

2. Permanent contracture in which case the contractures should be eliminated first and partial resection of the motor supply may be done later after a sufficiently long interval. If a markedly defective balance persists after exercise treatment.

3. Marked prevalence of the paretic element.

4. Mental deficiency or youth of the patient which prevents careful after-treatment by exercise.

Just as for the resection of the posterior roots it has been made an axiom by Foerster himself that developmental and educational exercise treatment is the most important part of the whole treatment, which is only to be made possible or easier by the operation, so too before doing Stöfel's operation one must be sure that an opportunity will be afforded to give the patient a sufficiently long careful after-treatment.

The technique of the operation is briefly described for partial resection of the motor supply of the triceps cruris and the pronator muscles of the forearm. A modification of Stöfel's operation by the author consisting in transplanting some of the motor supply of the triceps into the peroneal nerve is briefly described.

Hardouin P: Two Complete Nerve Sections Treated by Suture with Functional Restoration in the Domain of the Injured Nerve. (Note sur deux observations de section nerveuse complète traitée par la suture avec récupération fonctionnelle dans le domaine d'un nerf lésé) *Bull et mém. Soc. d'Anat. P.* 9 6 xlii, 6 2

The two cases reported by the author were selected from a series of 36 cases of complete nerve sections which were operated upon. These were the only cases which the author has been able to follow.

The first case was a resection and suture of the internal popliteal sciatic on the right. The op-

eration was done in January 1915 four months after the injury and voluntary motility was effective four months later.

In the second case there was a complete section of the radial nerve which was sutured in February 1915. Voluntary movements in this case were not noticeable till ten months later.

In the first case the injury had not caused a total anatomic section of the nerve but the presence of a voluminous neuroma necessitated resection.

In both cases there was complete restoration of the electric functions of the nerves.

W. A. BRYAN

MISCELLANEOUS

CLINICAL ENTITIES — TUMORS ULCERS ABSCESSSES ETC

Lambert R. A. Tissue Cultures in the Investigation of Cancer. *J. Cancer Research* 19 6 1 169.

A review is given of the results which have been obtained with tissue cultures in studies upon cancer and related subjects. The technique is described and emphasis is laid on the fact that the temperature of the culture medium and the tissue does not have to be rigidly controlled while the cultures are being made; moreover some time can elapse between the taking of the tissue specimen from the body and its immersion in the plasma medium in which it is to grow. There has been very little trouble from bacterial contamination, probably because of the fact that serum has a bactericidal property of itself. The principle in general consists in placing small pieces of tissue 0.5 to 2 mm. in diameter in plasma derived from the blood of the same animal making the whole a hanging drop preparation and sealing it with vaseline.

Sarcoma and connective tissue cells are wont to wander out singly or in chains, while epithelial cells normal or neoplastic, tend to spread in sheets or groups. The cancer-cell, especially the sarcoma cell, tends to show a greater motility as compared with the corresponding normal element. Sarcoma cells may often be seen traveling through the medium at a rate equal to that of a polymorphonuclear leucocyte. This fact probably throws light on the mechanism of the invasive growth and spread of cancer in the body. The author calculates that a cancer-cell by means of this locomotion might in four weeks make its way to the axillary fossa. Continued propagation of normal cells especially those of connective tissue is as a rule much easier than in cases of tumor-cells. Many carcinomata and sarcomata are very difficult to propagate even in primary cultures, while others quickly die when transferred early into fresh plasma. On the other hand connective tissue becomes much more active in subcultures. Tumor-cells are much more susceptible

to heat than it kills them much more quickly than it does active tissue cells.

The author quotes Lambert and Hanes who found that rat sarcomata cells will grow quite as well in the plasma of an immune rat as in the plasma of a normal rat without immunity. This observation affords further evidence that cancer immunity is not to be attributed to circulated antibodies of a cytotoxic nature. They are further able to show that an animal of foreign species particularly a rabbit may give plasma satisfactory for the growth of tissue elements derived from an alien species. The plasma of an animal that has been immunized to either the tissue or the blood of another is unsuitable as a medium of growth for the cells of the animal which supplies the immunizing substance. In other words it is distinctly toxic for these cells. The author emphasizes the fact that variations in growth of preparations occur from the factor of the depth of the hanging drop and the density of the fibrin meshwork. These two factors influence the extent to which the active motile cells wander out. The author cites an instance where an extract of human tumor appeared to inhibit rather than to stimulate the growth of normal human cells.

He has been disappointed in stimulating tissue cultures by using Scharlack R. and Sudan III. He thinks however that in spite of the fact that possibly with the exception of increased temperature there has been little found that will stimulate tissue growth, this is a most important and interesting field of investigation in regard to the cancer problem.

H. G. SLOAN

Collins, G. N.: The Effects of Cancer Tissue and of Normal Epithelium on the Vitality of Protozoa; Didinium Nasutum. *J. Cancer Research* 9 6 1 205.

In experimental study the author used didinium nasutum which lives on protozoa and will not eat bacteria, so that he was able to control the factor of predation to a certain extent in the food given them to live on. The carcinomata he used were

derived from tumors inoculated into mice, at varying intervals, so that when needed they were of the same age and approximately of the same size. The tumor was fed to the didinium in definite stated amounts in addition to their normal food supply of paramecia. Two series of controls were run. All the didinium were derived from the same stock. The treatment was given in three periods of five days each, from Monday to Friday inclusive. The living indicators of the didinium were observed for varying periods after such treatment and compared with the normal controls, attention being especially paid to their rate of multiplication and their death. Identical experiments were conducted, only that normal epithelium from the mouse abdomen was substituted for the cancer tissue in feeding. The dosage of food was accurately gauged. All tissue fed was finely minced and given fresh.

b) The conclusions drawn from the cancer feeding were: (1) cancer tissue contains something which produces a depressant effect on didinium; (2) it also produces something which produces a stimulating effect. In weak doses the stimulating factor of cancer tissue is apparently more noticeable than the depressing effect, or lethal. Larger doses than usual were fatal through all the organisms. In feeding normal epithelium the authors found there was no depressant lethal factor in it but that it caused a stimulation of the organisms. The double dose with cancer feeding gave a mortality of 4 per cent or more than twice that of the control, 3 per cent, while the double dose with epithelium gave a mortality of 6.6 per cent against 10.6 per cent of the control. With four times as much tissue material in the double dose series as in the half dose, the death-rate with normal epithelium was not raised even to that of the normal controls; hence the lethal factor cannot be due to an exhaustion from the excess of the stimulating factor.

The authors then propose a theory for the origin of cancer, namely, that cancerous changes may originate in cells from the predominance of the stimulating factor. This, he thinks, may be caused by the autolysis of cells which are being constantly destroyed at the seat of any chronic irritation. He quotes Bullock and Rohdenburg, working in his laboratory who showed that in rats that had the posterior lobes of their pancreas closely ligated and allowed to remain and autolyse still the adjacent parts of the pancreas showed greatly increased mitosis.

H. G. SLOAN

Ball, E. T. and Hendri A. T. Renal Tumors in the Rabbit. *J. Cancer Research* 9: 61-57

Ball and Hendri believe that new-growths of any kind are very rare in rabbits. Although the rabbit is very extensively used for laboratory purposes, reports of only 35 tumors were found. Of the recorded tumors 24 were terine and 3 were tumors of the kidney. The authors note neoplasms occurred in adult male rabbits both having been found on the same afternoon, and although they

state that they have autopsied over 400 rabbits during the last three years, no other tumors have been seen. It was impossible to ascertain the ages of the rabbits or whether or not they were both from the same litter since animals obtained from different persons had been put in the cage together. In the first case a physical tumor 4 cm. in diameter was found about the center of the outer border of the left kidney. Apparently it was of cortical origin since it did not invade the medulla. It was sharply marked off from the renal tissue fairly firm, and whitish gray in color. A thin prolongation of renal capsule covered the tumor. No metastases were found. The second case was very similar to the first though apparently in a much later stage of development. There were a few small areas that closely resembled the structure of the first tumor but almost everywhere the cellular masses characteristic of the first tumor had differentiated into solid cords and tubules.

These rabbit tumors thus correspond closely with those neoplasms of the human kidney commonly described as adenocarcinoma. The simplest interpretation of their origin is to regard them as having developed from portions of the met nephrogenous tissue which became enclosed in the kidney during its early development but failed to form connections with the collecting tubules. Since a striated muscle was present they are not comparable, the authors state to the mixed tumors of the kidney which occur so frequently in children, and which are best explained as derived from portions of the primitive segments.

GEORGE E. BRIMLEY

Tyzer E. E. Tumor Immunity. *J. Cancer Research* 9: 61-5.

In a consideration of tumor immunity it appeared to the author desirable to discuss resistance to spontaneous tumors and to implanted tumor separately. Although results obtained with experimentally implanted tumors have contributed to the biology of tumors, these results cannot be applied directly to spontaneous tumors and this is especially true with respect to immunity. It has long been recognized that immunity to implanted tumor gives no assurance against the subsequent development of spontaneous tumors.

The results of the experimental investigation of tumors, as well as of clinical and pathological observations, appear to favor the following conception of the nature of tumors and their relationship to the other tissues.

The interreactions of the normal tissues are mutually beneficial so that their relationship is one of symbiosis.

The anomalies and benign growths, while not distinctly harmful are usually of no benefit to the individual; the relationship is one of commensalism.

The malignant tumors are in many respects parasitic in nature, especially since they develop at the expense of the other tissues of the body. They are so adapted for growth, once they have become estab-

lished that they seldom arouse any effective resistance on the part of the body. There is some evidence, however, of a local reaction of tissues unfavorable to the growth of many different types of tumors.

Immunity to transplanted tumor is based on foreignness or incompatibility of tumor and host. This holds true whether the tumor or the animal is taken as the constant factor with which to test the other. Although the degree of foreignness is not sufficient for the production of markedly cytotoxic or cytolytic sera as when different species are employed it appears probable that an immune body is formed which in the presence of the antigen—or living tumor—excites an inflammatory reaction in the tissue around the tumor so that the latter is isolated and eventually destroyed.

Both susceptibility and non susceptibility or the ability to acquire immunity are inherited not as a single unit factor but apparently as a complex of Mendelian factors. Non-susceptibility and susceptibility are apparently based on factor differences or in other words on unlikeness or foreignness. Non susceptibility may thus depend with one tumor on a difference with respect to new factors and with another tumor on a difference with respect to many factors. In the comparison of a stock of Japanese waltzing and several stocks of common mice the non-susceptibility of the latter to a carcinoma J. W. A. is based on a difference with respect to a large number—probably twelve to fourteen—of independently inherited factors.

Susceptibility is in this material a dominant character since it is manifested when its factors are present in a single representation as in the F₁ hybrid. The presence of a single representation of the factors of non susceptibility in the F₁ hybrid apparently stimulates the growth of the tumor for its rate of growth is more rapid than in the Japanese walking mouse in which the factors of susceptibility are doubly represented.

There are marked differences in the behavior of various tumors on transplantation in given classes of mice. Even tumors arising in homogeneous races show such differences and thus may be attributed to the acquisition of new characteristics by the soma which are manifested in the development of the tumor. The tumor since it breeds true with respect to these characteristics in the course of asexual propagation may be regarded as a modification of the somatic tissue which may be termed somatic mutation.

GEORGE T. BELLAY

Simon C. Cure of a Suppurated Chancrous Bubo
in Eight Day With ut Apparent Catrix by
Filliform Drainage (1 rise 1 b bon hancet
l ppur en h t jour 1 nires ppar
1 1 f l d ge l form 1 B l t m Soc
mel d hdp d P q b l 3 8

Simon reports a case which ten days after recovery from soft chancre showed ulceration of the glans and a left inguinal adenitis. After about twenty

days treatment by puncture etc with little effect. filiform (thread) drainage of the bubo was instituted. Immediate improvement was observed and in eight days the skin had a normal appearance.

The author has tens to report this case in which he thinks the method of plumb training transformed a long and weary disease into a light ailment because he thinks that the procedure is of distinct therapeutic value in the treatment of tuberculous disease.

W. A. BLESS, N.

Sequeira J H Dermatology and Molluscum
Fibrosus with Congenital Verruca Cordis
and Kyphosis P a k s M d
D x s [el S t 94

The case is reported of a man age 21 who resembled a boy of 15 presenting a remarkable pendulous growth on the left side of the face although the skin of his face and his jaw had grown many times more redundant and shiny than over his cheek. Illustration shows the improvement in the patient's appearance after a remarkably successful cosmetic operation. He is now

Quillian G W Acidosis in Surgery 1 5 8
Phila. 9 6 1 1 1 385

The author having observed that the progress of the gangrene of a diabetic leg varied with the presence or absence of haematuria in the urine, he undertook a consideration of the influence of acidosis in a series of cases. The report is based on a study of 138 consecutive major peritonsillectomies. Except in a few emergency cases in which high glucose and soda assays was given as a precaution, a normal short time before the operation the following preliminary routine was followed:

Soda bicarbonate 53s in one half glass ater T
f d. one half hour before meals was given for two
days preceding operation

Soda bicarbonate and glucose 22.5 g with water q. s. ad 300 ml was given as a retention enema, 1 l. i. d. for two days preceding operation. Liquid diet and large quantities of water were given for 48 hours preceding operation but no buttermilk or egg albumens for 24 hours preceding operation.

Castor oil 358 was given the morning preceding the day of operation. Soap suds en mata were used the night preceding and the morning of the operation.

Strontium bromide gr xxx was given the night preceding operation to insure a good night's rest. Morphia gr 1/8 with scopolamine gr 1/100 was given one hour preceding gas and eth. anesthetic.

After operation the patient was again given soda bicarbonate 5ss in one half glass of water one half hour after meals for several days. Water and liquid diet were given as soon as nausea ceased and continued until a light diet was given on the fourth day. An eliminant was given on the third day after the operation.

There was no mortality in the entire series and only five cases of appreciable shock. This has led

the author to believe that acidosis has a dominating influence in surgery and that by careful pre- and post-operative treatment it may be largely eliminated. From this series, he believes that post-operative nausea is greatly diminished by the preliminary use of soda bicarbonate. GATEWOOD

SERA, VACCINES, AND FERMENTS

Sellards, A. W., and Minor, G. R. The Antagonistic Action of Negative Sera upon the Wassermann Reaction. *J. Med. Research*, 9 6 xxxi 3

At the time when the Wassermann reaction was first inaugurated it was assumed that its mechanism was completely understood, i. e. that it conformed precisely to the Bordet-Gengou phenomenon of complement fixation. With the demonstration that specific antigen was not only unnecessary but that it was inferior to some of the non-specific antigens, it became evident, once that complement fixation as applied to the diagnosis of syphilis cannot be explained on the basis of the phenomena of Bordet and Gengou. Not only is the reaction non-specific but it is now well established that the Wassermann reaction may sometimes occur in certain conditions other than syphilis.

Investigation as to whether normal sera are truly negative, in the sense that they would antagonize a positive serum forms the basis of this paper. These findings are considered in regard to their practical bearing upon the Wassermann reaction and upon the method of complement fixation in general.

A simple method was adopted in order to test the effect of negative sera upon a positive syphilitic serum. A small amount of negative serum was mixed with the minimal amount of positive serum that would cause complete fixation. A Wassermann reaction was done on this mixture in the usual routine way after it had been incubated for a short time. From their findings the authors draw the following conclusions:

1. Sera which give a negative reaction with the Wassermann test possess definite inhibitory properties toward positive syphilitic sera except in certain special cases.

2. The extent of this inhibitory action in negative sera varies widely in different diseases but it is usually comparatively weak. It is easily demonstrable even though it is present only in slight degree.

3. Human sera present three distinct phases in their behavior toward the complement fixation of the Wassermann reaction: (1) negative (2) positive and (3) inert action.

These results are explained most readily on the basis of a balanced mechanism. The inhibitory action of negative sera cannot be accounted for solely on the basis of its content in natural sheep antioceptor. GEORGE E. BRILL

Smith N. R. The Serotoxin of Jobling. *J. Lab. & Clin. Med.* 9 6, 4, 524.

The production of a serotoxin by treating homologous and heterologous sera with chloroform and

ether as reported by Jobling has found wide acceptance among workers in the field of anaphylatoxins and is incorporated in the literature of the subject alongside the earlier pioneer work of Richet, Bordet, Friedberger, Nathan, and others. Jobling maintains that the ferment action of the serum is held in abeyance normally by an unsaturated lipoidal antitryptic substance the removal of which by lipid solvents permits the lysis of serum proteins, thereby forming poisons which in all probability deal with the antigen-protein split product. Some work was under way in his laboratory in which splitting of germ substance by sera was the desired end.

In the light of Jobling's work it seemed to the author reasonable to assume that the splitting action of the sera could be greatly increased and accelerated by shaking with the sera with chloroform before incubation with the germ substance. Therefore rabbit serum was shaken with one-tenth its volume of chloroform four or five times, then centrifuged at 8000 R. P. M. for ten minutes and the supernatant serum carefully pipetted off from a precipitate that upon centrifugation was interposed between the chloroform at the bottom and the serum above. As a matter of routine controls were made by testing the chloroform serum on guinea pigs before incubation with the germ substance. As high as 0.5 ccm. of the normal untreated serum had been injected without effect, but since the M. L. D. of serum and germ substance after incubation was known by trial to be 3 ccm. or less, the control injection of the normal serum was usually limited to 3 ccm. But upon the injection of the chloroformed serum in 3 ccm. quantities as a control, that is, without incubation with germ substance, the pigs died instantly. Reduction of the dose to one cubic centimeter still produced death in most cases, and always a marked prostration.

The character of the deaths, together with the autopsy findings, clearly indicated typical anaphylaxis and pointed strongly to the residual chloroform in the serum as the toxic agent.

Smith concludes that the intravenous injection of high dilutions of chloroform may cause sudden death in guinea pigs and that when blood serum has been shaken with chloroform the complete removal of the chloroform is difficult. The toxicity of the serum falls with the completeness of the removal of the chloroform. Death in guinea pigs caused by the intravenous injection of serum which has been shaken with chloroform is often at least, he states, not typical of anaphylactic shock. Serum when shaken without chloroform may cause typical anaphylactic shock with death and typical autopsy findings. GEORGE E. BRILL

Haktoen, L. Vaccin Treatment. *J. Am. Med. Ass.* 9 6 lvi, 59

The general results so far from the routine use of commercial vaccines polyvalent and mixed, have no value as evidence for or against curative usefulness.

ness of vaccine treatment and hence no value either with respect to the soundness of the theory on which vaccine treatment primarily has been developed.

In subacute and chronic localized infections the results appear to indicate that specific vaccines properly and skillfully used have value quite likely because they increase the production of specific antibodies as demanded by the theory but probably also because they stimulate leucocytic and other activities.

In typhoid fever and possibly also in other infectious diseases the intravenous injection of specific vaccines and also of other substances may induce crisis and prompt recovery. The mechanism of this action is not fully understood but as it involves something more than or different from specific stimulation of the production of antibodies it cannot be interpreted in terms of the current conception of the action of vaccines. We are entering therefore upon a new and interesting development in the study and treatment of infectious diseases.

EDWARD L. CORNELL.

BLOOD

Della Valle, L.: Suppurative Hematoma of the Iliac Fossa (Ilioma suppurativa della fossa iliaca). *Riforma* 1906 11 99.

The author says that while almost every variety of hematoma has been the object of very close study and detailed description deep hematomata of the iliac fossa do not get the amount of attention which their importance demands particularly on account of their complications in suppurations. His article is therefore devoted to a detailed description of the pathologic anatomy, symptoms, diagnosis and treatment of this condition.

His study is based on clinical data obtained in hospital cases observed and operated upon by him within the past few years.

In the treatment of these suppurative hematomata it must be noted that the pus forms a vast subperitoneal focus which is limited in front by the fascia iliaca and beneath by the crural arcade. To open this therefore the incision must be horizontal and above the arcade in a point indicated by the fluctuation while avoiding the epigastric artery. The skin subcutaneous fascia, the aponeurosis of the oblique muscle, the transverse and the fascia transversalis must be cut through before the pus focus is reached. A hematoma of large dimensions may more conveniently be evacuated by a lumbar incision.

W. A. BRENNAN.

Kleiner, I. S.: The Disappearance of Dextrose from the Blood After Intravenous Injection. *J. Exp. Med.* 1906 10 15.

The chief purpose of the author's present work was to study the disappearance of sugar from the blood under various conditions. In order to obtain a basis of comparison a series of experiments

was first carried out in which dextrose was injected into normal animals. These experiments brought up the question as to whether the passage of sugar from the blood into the tissues was a vital process and led to a series of experiments in which dextrose was injected into dead animals. These experiments yielded the following results:

1. As has been found by other investigators when a large amount of dextrose is injected intravenously into a normal dog it disappears from the circulating blood in about 60 minutes after the end of the injection. Varying amount — an average of 60 per cent — are excreted in the urine.

Even in nephrectomized animals the same quantity will leave the circulation in the same length of time as in normal animals.

2. This phenomenon seems to be at least to a great extent independent of vital processes since dextrose after intravenous injection into dead animals is found to leave the blood rapidly.

3. The phenomenon is independent of the important abdominal organs for it also occurs in animals (living or dead) in which the aorta and inferior vena cava have been ligated near the diaphragm thus abolishing most of the circulation posterior to the diaphragm.

4. The fact that a considerable amount of the sugar passes from the circulation into the surrounding tissues was established by finding an increase in the carbohydrates of the muscle tissue. This was done in the case of the living anterior animals and in the whole of anterior dead animals. In most of these experiments there was also evidence of the formation of polysaccharides in the muscle tissue.

GEORGE E. BRLEY.

Willmoth, A. D.: Some of the Uses and Abuses of Normal Saline Solution. *Am. J. Surg.* 1906 11 147.

The author reviews the history of transfusion with its many difficulties and uncertainties dating as far back as 1492 when Pope Innocent VIII was given intravenous transfusion of blood the donors being three boys. This effort was like many subsequently unsuccessful and not until the middle of the seventeenth century did transfusion become a recognized surgical procedure. In 1666 Lower wrote the first detailed account of transfusion followed soon afterward by Denys of France with three successful cases. It being little more than a curious experiment after several unsuccessful efforts it was abandoned until the nineteenth century.

An attempt was made to overcome unfavorable results by using something that would supply the volume of blood yet be easier to obtain and safer to administer from a surgical viewpoint and would subject the patient to no danger of disease existing in the donor. Milk and other albuminous fluids were tried and soon abandoned.

Isolated cases occurred earlier but Schwartz in 1881 gave the first methodical description of saline

infusion, this being the first reliable information concerning the use of fluid to take the place of blood. Since more has been learned of the various constituents of the blood, their inorganic salts such as potassium and calcium, were added to the sodium chloride solution, Ringer and Locke's solutions, whose specific gravity should be 1.009 being most often used.

The fact that sodium chloride is found in liberal quantities in most of our food possibly accounts for its indiscriminate use in surgery. It is changed by lactic acid into sodium lactate thereby setting free hydrochloric acid. It is commonly believed that the kidney glomeruli have no limitations for excreting water and the chlorides.

The question of the use of salt solution has not been elaborately studied. Its uses are (1) to replenish the circulation, (2) to refill the blood vessels, thereby permitting the mechanical act of the circulation to proceed (3) in shock with adrenalin 1:1000 to 1:2000 to stimulate the heart and blood vessels, so that the blood accumulated in the large vessels is again placed in circulation, (4) to stimulate the action of the kidney and (5) its use in sepsis.

Salt solution may be used in the following ways: (1) intravenously especially after amputation and before tying the vessels, (2) intra-arterially (3) by hypodermoclysis, (4) by proctoclysis, (5) by leaving a quantity in the abdomen after celiotomy. It should be used at a temperature of 100° to 102° F. This temperature is perfectly safe, since gelatin coagulates at 58° F and serum albumin at 66° F and experimentally 65° F has been well borne by the dog. The heat acts as a stimulant to both heart and blood vessels, a point to be remembered by the obstetrician.

For the relief of shock it should be used in small quantities by the intravenous method at a temperature of 100° F frequently repeated, rather than one or more large injections, thereby avoiding overwhelming the heart. The conditions to be met are in striking contrast to those resulting from hemorrhage where death results from absolute loss of blood, not enough remaining in the vessels to sustain vital functions even though it could be kept in active circulation and death results from mechanical interference not enough blood remaining in the vessels to enable the heart and elastic arteries to transmit the force of the heart contractions to distant portions of the body. As consequence the blood fails to complete the circuit and all centers suffer from anemia carried to the point of death. Experiments have shown this would not occur, even though one-half or two-thirds of the total volume of blood be lost provided the circulation be maintained by supplying fluid in place of blood.

In the preparation and use of saline in any case, much depends upon the strength and composition of the solution also the technique of its administration. Too little salt causes the corpuscles to swell and lose their hemoglobin, or completely destroys

them too much causes them to shrink. To insure correctness tablets should be used or stock solution kept that has been prepared by actual weight. This solution should be prepared by sterilizing by fractional methods.

In private homes water from the teakettle is sterile enough for practical purposes to this add a heaping tea spoonful of salt and four drachms of glucose to the quart, this being accurate enough save for intra-arterial and intravenous use. As much as 500 ccm. can be easily introduced under each mammary gland or into the cellular tissue at a favorable point such as between the shoulders or over the abdomen. In the intravenous method difficulty is experienced in trying to locate partially collapsed vessels in using too sharp needle thereby piercing the opposite wall of the vessel, and by too rapid introduction. Not more than one ounce per minute should be used.

Abuses Under no circumstances should saline be used in apoplexy arteriosclerosis pulmonary edema, dilated right heart threatened sudden death or collapse from chloroform ether narcosis, the last two requiring more rapid measures. It should not be used in anemia. Not more than fifty grains of salt should be used to each one hundred pounds of body weight. If elimination be insufficiently rapid some degree of dropsy and edema must occur and is usually in the form of edema of the legs especially is this likely to occur in nephritic patients. C. C. Myers.

Krida A. The Indication for Blood Transfusion. 1924, J. U. I. 9, 6

The author describes some of the functions and properties of the blood. The indications for transfusion according to their pathologic physiology are classified as follows:

1. Conditions in which there is a deficiency in the quantity of the circulating fluid.

2. Conditions in which there is a deficiency of the respiratory elements sufficient in degree to impair the integrity of vital organs.

3. Conditions which are accompanied by disorders in the process of coagulation—increased susceptibility to hemorrhage.

4. Conditions in which the body has been invaded by infection and its products.

If concluded that blood transfusion is indicated in the following conditions:

Massive hemorrhage

Marked secondary anemia, either as a palliative measure or as a pre-operative measure.

3. Essential anemias.

4. Blood dyscrasias, if fresh human serum injections thrombin is ineffective.

5. Chronic localized infections if demonstrable etiology not amenable to other treatment. Immunized blood should of course be used in these cases.

No blood transfusion should be undertaken with

out first making agglutination or hæmolysis tests of the patient's and donor's blood.

LUCIAN H. LANDRY

Minot, G. R.: Methods of Testing Donors for Transfusion of Blood. *B. & M. S. J.* 916 131-66

The author reaches the following conclusions after a full discussion of the subject:

A donor for transfusion of blood should not only be healthy but should belong to the same iso-agglutination group as the recipient.

Simple and quick methods for testing this have been described. What these tests show *in vitro* can be taken as reliable evidence as to what may happen *in vivo* so far as agglutination and hæmolysis are concerned.

Even when donor and patient belong to the same iso-agglutination group there may occur however after transfusion, reactions of unknown nature which are probably of not so severe or serious a nature as hæmolysis.

Agglutination often does not occur *in vivo* and if it does it does not always cause a severe reaction because of the following three factors: (1) interference with agglutination by an excess of non agglutinable cells; (2) absorption of the agglutinin by the agglutinable cells; (3) the degree of concentration of the agglutinin.

Hæmolysis does not always occur *in vivo* when donor and recipient belong to different iso-agglutination groups because only about 20 per cent of sera that are agglutinative are hæmolytic. Hæmolysis however never occurs without being preceded by or associated with agglutination.

If hæmolysis is present in the plasma of the donor or recipient or both hæmolysis may not occur or may cause but a slight reaction *in vivo* because of the following factors and their quantitative relation to each other: (1) concentration of the hæmolytic concentration of the anti-hæmolytic and a certain degree of absorption of the hæmolytic by the hæmolyzable cells. In discussing these factors it is pointed out that in certain instances the knowledge of the strength of the anti-hæmolytic might be of value.

LUCIAN H. LANDRY

Singleton, A. O.: A Reliable Method of Blood Transfusion. *S. & M. J.* 916 1439

Singleton reports a method of transfusion successfully used in ten cases.

His apparatus consists of a graduated glass container with the bottom drawn out into two cannula-like processes for connection with the veins and with the top connected by a rubber tube with a pair of pressure bottles.

The container is sterilized, dried and coated with paraffin and connected with the veins of the donor and the recipient respectively following the usual technique except that the veins are flushed out with citrate solution prior to the insertion of the cannula.

About 30 cm. of a 1 per cent sodium citrate solution is poured into the container a tourniquet is tightened around the donor's arm and the clamp is removed from the vein. The pressure bottle is immediately lowered by an assistant producing a negative pressure in the container and the blood rushes in. The amount obtained depends upon the rapidity with which the lower the smaller is the amount obtained from the donor. At 200 cm. can be obtained at a time. Having secured this amount in the container the pressure bottle is immediately raised and the blood is forced into the recipient's vein of the donor's arm pressed between the thumb and finger and the lamp removed from the recipient's arm. At 200 cm. should be left in the container and the process repeated. It is essential to keep the blood moving.

Although this method is not complete it can be relied upon to transfuse any quantity of blood desired with perfect safety to the patient and the author holds that it gives a procedure that is more uniform and more easily controlled than that obtained by the use of a syringe.

Of the 10 cases transfused were 4 pellagra, 2 for pernicious anemia, 1 for purpural sepsis, 1 for pernicious malaria, and 1 for hæmorrhage. The three cases of hæmorrhage showed rapid improvement and were cured. The case of pernicious malaria showed marked improvement but the other cases died. In one of the cases of pernicious anemia an unrelated person was the donor in a second transfusion. On the second day following this transfusion the patient developed a temperature of 101 which persisted for several days and he suffered some slight hæmorrhage from the nose.

The author emphasizes the importance of making Wassermann, hæmolytic and agglutination tests with the blood of the donor previous to the transfusion, but regards the blood of an immediate relative as perfectly compatible in the greater percentage of cases.

J. W. T. RENE.

Peterson, E. W.: Results from Blood Transfusion in the Treatment of Severe Post hæmorrhagic Anæmia and the Hæmorrhagic Diseases. *J. & M. S. J.* 916 1439

Peterson studied the results of blood transfusion in severe hæmorrhagic anæmia and the hæmorrhagic diseases. His conclusions based on the literature and a series of nine cases reported in detail are as follows:

Transfusion of blood in muscular injections of whole blood and intravenous and subcutaneous injections of homologous serum are the most efficient measures and are of value in the order named in the treatment of hæmorrhage and the hæmorrhagic diseases.

In severe cases of acute post hæmorrhagic anæmia, blood transfusion is the best and at times the only efficient means of resuscitating a dying patient. In chronic post hæmorrhagic anæmia provided the cause of the bleeding is removed or

remedied no other measures will compare in efficiency with transfused blood in producing hematopoietic stimulation.

In pathologic hemorrhage, transfusion of blood has on numerous occasions proved effective after the failure of all other measures. It should be resorted to then, in those cases which do not respond promptly to the simpler methods of treatment.

A. EMMERTON.

Barnes, F. R.; and Stocum, M. A. Direct Blood Transfusion with the Kimpton Brown Tubes. *Am. J. M. Sc.* 9 6 cl, 727

Of the 9 cases reported by the authors 8 suffered from hemorrhage and were practically moribund when transfused the other suffered from sepsis. One of the cases of hemorrhage was complicated by peritonitis and another by a large carcinomatous mass at the head of the pancreas.

The only difficulty experienced in the use of the Kimpton-Brown tubes was in keeping the stoppers in when pressure was applied to force the blood into the recipient's vein. This difficulty was avoided after the first transfusions by pressing the palm of the gloved hand firmly against the top of the tube while it was being emptied, the stoppers being discarded altogether. With this technique the tubes proved entirely satisfactory.

Six of the patients showed immediate and marked improvement in the general condition and as indicated by the increase in the hemoglobin estimation and in the red-cell count after the transfusion. The patients who died were those suffering from sepsis and one suffering from carcinoma.

The authors were impressed by the value and simplicity of the Kimpton Brown method of transfusion. They emphasize the value of transfusion in all cases suffering from grave anemia, particularly that due to hemorrhage but consider it futile in cases of sepsis.

They found it best to have the donor and recipient so far apart that neither would in any way disturb the other nor interfere with work upon the other.

J. W. TUMBA.

BLOOD AND LYMPH VESSELS

Morton, C. A. An Unusual Form of Gunshot Arteriovenous Aneurism in Which the Sac was Situated on the Side Opposite to the Vein. *Lancet* Lond. 9 6 cl, 557

In the ordinary form of arteriovenous aneurism the aneurismal sac lies between the artery and vein and the communication between the artery and vein is through the sac. In the case which is now recorded there was a communication between the artery and vein, due to the passage of a piece of projectile through them, and on the side of the artery opposite to the communication, where the portion of projectile had passed out of the artery was an aneurismal sac. Where the portion of projectile had penetrated the vein—i.e., in the side of the vein

farthest from the artery—was what may be called a venous aneurism i.e. a cavity in the tissue containing old blood-clot, communicating with the vein. The piece of metal evidently passed through the vein and artery from below upward.

This is a very rare type of arteriovenous aneurism, there being only one similar case in the series of 50 gunshot aneurisms reported in the *British Journal of Surgery* of October 9 5 J. H. SKILLER.

Fuller E. B. Notes on a Case of Aneurism of the Dorsalis Pedis Artery. *Se African M. Rec.* 9 6, 21 35

A male, aged 50 complained of a painful swelling on the back of his left foot, which had appeared a month previous and gradually increased in size. He denied any history of injury to the foot.

On the back of the left foot just below the annular ligament in the line of the dorsalis pedis artery was pulsating swelling about the size of a small hen's egg. The skin over the swelling was glazed and reddened and there was considerable tenderness and pain. The appearance of the swelling apart from the evident pulsation gave the impression of an abscess about to burst. Pressure on the artery above stopped the pulsation in the tumor. The swelling was diagnosed as an aneurism and it was decided to excise it.

The artery was ligated above and below and the sac, which contained considerable amount of blood-clot was excised. The aneurism was a curious mixture of the fusiform and sacular. At the upper part the artery seemed to have gradually dilated into a fusiform channel and then suddenly a sac was formed in its course doubtless from the more complete rupture or stretching of the coats of the vessel.

The patient made an uninterrupted recovery the wound healing by first intention. It may be mentioned that the patient's arteries were atheromatous and he had a double aortic murmur.

EDWARD L. CORNELL.

Neuhof S. Diagnosis, Symptomatology and Therapy of Dilatation Aneurisms of the Descending Thoracic Aorta. *Am. J. M. Sc.* 9 6, cl, 7 5.

The author recognizes dilatation aneurisms of the descending thoracic aorta as a distinct clinical entity presenting characteristic symptoms, and reports a number of illustrative cases.

The most constant sign is an impact area to the left of the sternum at its middle third. By placing the eye on a level with the chest a distinct heaving area, distinguishable from that of the apex and occupying the lower left sternal intercostal spaces, can often be detected. A sense of impact is also received when the bell of the stethoscope is placed over this area. This impact sensation may be well detected by snugly fitting two or three fingers in the left middle interspaces near the sternum. Occasionally a systolic thrill is palpable. In some

instances it is possible to detect a difference between the time of the apex impact and that in the left middle interspaces near the sternum. This is best done by placing one finger over the apex and another over the left sternal border. These signs are made more evident by having the patient hold his breath.

There is usually a rough systolic murmur over the dilated aortic area, the second sound has a liquid rather than an accentuated tone and is prolonged so as to occupy the entire diastole or is followed by a diastolic murmur of varying intensity. Pain when present is substernal, or may be referred to different parts of the chest, neck, jaws, or head, and is most apt to occur after exercise. These signs are usually associated with some evidence of cardiac decompensation which may not however be a marked clinical feature.

The impact to the left of the sternum and the characteristic murmurs suggest the condition, but it is absolutely essential to have roentgenograms or a fluoroscopic examination to clinch the diagnosis. The condition is a leucic manifestation and in all cases antisyphilitic medication is indicated.

J. W. TURNER.

Bernheim B. M. Choice of Operation in the Cure of Aneurisms of the Extremity. *J. Amer. Med. Assn.* 1916, vol. 3, 16.

As so many surgeons are poorly prepared to successfully cope with aneurisms, Bernheim offers several suggestions to assist in making a proper choice of procedure in aneurisms of the extremity.

The test devised by Moskowitz is recommended. This consists of rendering the leg bloodless by an elastic bandage applied to the upper pole of the aneurism; the blood stream is then shut off in the parent vessel by a pad in Hunter's canal. When aneurism is still the elastic bandage is quickly removed and the returning hyperemic wave carefully noted. Should the blush quickly spread throughout the leg compensatory circulation is assured and the parent artery may be occluded. Should the leg remain pallid, collateral circulation is absent or slight and occlusion contra indicated.

Again normal pulsation of the arteries of the foot show an absence of compensatory circulation while a lack of pulse practically assures sufficient collateral blood supply.

A case in point is given in which an aneurism of known syphilitic origin and of rapid growth was found in the popliteal space. There was pulsation of the arteries in the foot and the Moskowitz test negative. Therefore after removal of the aneurismic sac the gap was bridged by a venous transplant from the saphenous vein care being taken to reverse the vein so that the valves faced the foot. Immediate resumption of the blood stream occurred, the arteries of the foot pulsed normally and the troublesome symptoms of edema and numbness entirely disappeared within a short time.

P. M. CRANE.

Makins, G. The Importance of Auscultation in the Diagnosis of the Vascular Injuries Accompanying Gunshot Wounds. *La. & Lo. J.* 1916, vol. 8.

The author reports his experience in dealing with injuries of the blood vessels during the war.

He lays stress on the fact that in any case of swelling of the limbs in connection with gunshot wounds the stethoscope affords a ready means of establishing a diagnosis if there is an aneurism present. The point at which the bruit is loudest and highest pitched will show where the lesion is situated. Aneurisms involving either the arteries, or the arteries and veins show in addition to the local bruit at their site also a transmitted bruit in the region of the heart.

The author has not met with any instances in which a pure arterial murmur in connection with the wounded vessels of the arm was audible in the heart, but he has noticed it in a carotid aneurism and has frequently seen it in connection with the femoral vessels. These transmitted bruits show a temporary persistence. The heart at first is markedly affected, enlarged and with an increased rate after a few weeks it is able to compensate at which time the bruit disappears unless closely associated with the heart. He thinks that the cardiac disturbance is probably to be explained by the sudden alteration in the force required for the maintenance of general circulation under the altered conditions.

H. G. SLOAN.

Elsberg, C. A. The Surgical Significance and Operative Treatment of Enlarged and Varicose Veins of the Spinal Cord. *Am. J. Med. Sc.* 1916, vol. 64.

Among vascular lesions of the spinal cord such as aneurism, angioma or enlargement or tortuosity of the superficial veins although relatively common have received little attention in the literature. When the posterior spinal veins are compressed by an extradural neoplasm the veins for some distance below (on or both of the two main trunks) appear engorged and sometimes more tortuous than normal. The appearance on exposure of the cord is quite different from the pinkish hyperemic look of the distended arteries and veins in intradural inflammatory processes.

The operator should recognize the significance of these enlarged and tortuous veins. A local enlargement or varicosity may take place causing local spinal symptoms relatable by operation. Cases have been reported of varices or hemorrhoids of the spinal pia, the symptoms of which are usually those of a transverse lesion.

In several of the author's six cases the enlarged vein accompanied one of the spinal roots to the dural opening. The abnormalities were of various kinds the enlarged veins usually pressing upon spinal roots. These were in the dorsal region in five lumbosacral in one. The condition was always unilateral, proving it not to be due to the operation.

itself. In one case a tuberculoma of the cord was present. One case examined microscopically showed hyaline degeneration of the vessel walls. The author's technique in operative treatment consists in the removal of as large a part as possible of the enlarged vein by raising and ligating with fine silk in an aneurismal needle. As the veins are very fragile great care is necessary.

The results were improvement or relief in all but two cases which had spastic paraplegia following standing. The author is uncertain as to whether the venous condition is a cause or effect of spinal-cord disease, and thinks the operative result may be due to the decompression by laminectomy.

HORACE BINNEY

POISONS

Tullidge E. K. Tetanus; Surgical Complication in the Present War. *Y. I. M. J.* 9 6 cli, 02.

Tetanus is a very common complication in the present war. There is usually a mixed infection present. The anaerobic nature of the organism is especially suited to the ragged and deep character of the majority of the wounds. The filthy condition of the soldiers, especially their contamination with ground which has been fertilized by ages, predisposes them to inoculation with the tetanus bacillus whenever a wound is sustained.

The usually prodromal symptoms are stiffness and pain in the muscles, especially those of the head and neck. These steadily increase in severity until convulsions ensue.

The use of antitoxin is highly recommended as a curative measure. Enormous doses are used by the author, from 10,000 to 60,000 units being given. The local treatment of the wound is important and the liberal use of tincture of iodine seems to be beneficial.

J. H. SKILES

MacConkey A. T., and Zilke, S. S. Iodine in Tetanus. *Brit. M. J.* 9 6 i, 41.

It is a well-established fact that iodine when mixed with tetanus toxin possesses the power of rendering the latter non-toxic. The longer the period of contact between the iodine and the toxin before injection the less toxic the latter becomes. A mixture of equal parts of iodine and tetanus toxin also possesses the power to produce immunity to subsequent injections of the toxin.

These facts suggested the thought that iodine might be of value in curing tetanus, and series of experiments was carried out with that in view. The conclusions reached are that iodine when injected subcutaneously has no effect upon tetanus toxin which has also been injected subcutaneously in different place. The course of tetanus can not be favorably influenced by injections of iodine alone nor does the latter seem to have any effect in enhancing the power of antitetanic serum. Iodine can only be of use when applied to the infected focus, so that it comes into direct contact with the toxin before absorption.

E. K. ARMSTRONG

Robertson H. E. The Prophylactic Use of Tetanus Antitoxin. *Am. J. M. Sc.* 9 6 cli, 668.

Robertson in reviewing the prophylactic use of tetanus antitoxin, explains its failure in some cases by pointing out the rapid formation and absorption of tetanus toxin, associated with the extreme rapidity with which it is bound to the nerve-cells, when it cannot be neutralized. The absorption of the antitoxin into the blood is relatively slow allowing time for the more rapidly formed toxin to gain such headway as to produce fatal results.

Another reason for the failure in some cases is the short duration of immunity conferred by the prophylactic dose, usually fifteen to twenty days. When for one reason or another the formation of the toxin is delayed or not absorbed (delayed tetanus) the period of protection has passed and the disease develops. Lethal surgical interference in wounds of patients that have remained free from the symptoms for many days or weeks active symptoms of tetanus will suddenly follow a reopening of the wound as an impetus. Consequently when such interference is contemplated, a second injection of antitoxin should be administered.

Other of his conclusions are that the most ideal and perfect protection against tetanus is the production of active immunity produced before infection has occurred. This admittedly is not practical, but deserves further consideration and research.

In a large majority of cases the subcutaneous injection of twenty units immediately after the injury will prevent with certainty the occurrence of tetanus. The delay of a few hours in making the injection may mean the loss of life.

Local applications of fluid antitoxin in wounds are efficacious but unnecessarily wasteful and not always practical.

In cases where injections cannot readily be made, especially in war time, the immediate application to the wound of dried antitoxin tampons moistened by clean fluid may be used as a temporary substitute until fluid antitoxin can be injected.

D. L. DESPARD

Everidge, J. Mental Symptoms Complicating Case of Acute Tetanus During Treatment by Carbolic Injections. *Brit. M. J.* 9 6 i, 413.

Eleven days after having received severe injury to the lower extremities, the patient developed tetanus, which rapidly grew worse. Antitetanic serum was given together with 100 cc. of 30 carbolic acid solution subcutaneously every four hours. For a week the spasms were so severe that the patient was given large doses of morphine, chloral, and bromides. At the end of this time the spasms became less marked but the mental condition showed a great change, a condition resembling delirium tremens developing. This lasted five days, during which time restraint was necessary. Incontinence of urine and feces was present also. Chloral and bromides had no effect but paraldo-

byde had a quieting effect. A relapse occurred within a month after the development of the tetanus before the patient's mental state once more approximated the normal.

The author wonders what the connection is between the carbolic acid injections and the condition. One c. m. of the 1:10 solution was given every four hours over a period of about 12 days.

E. K. ANDRUSOV

Dean H. R. and Mout T. B. Bacteria of Gangrenous Wounds. *J. R. I. M. M. C. P.* 916 April 349

The authors give an interesting account of a prolonged study of the bacteria in gangrenous wounds at the Third Northern General Hospital which has brought out points of great interest to the bacteriologists and surgeons as shown in the following summary:

1. The series comprises 18 cases of gangrenous wounds of which only three were fatal. Included in this total are 4 cases of tetanus, 1 of which was fatal and 4 cases of gas gangrene, 2 of which were fatal. Among the 18 cases bacillus edematis maligni was found in 5 and bacillus aerogenes capsulatus in 13.

2. Bacillus aerogenes capsulatus and bacillus edematis maligni are apparently possessed of powerful enzymes. The former is peculiarly able to attack carbohydrates, the latter proteins. Dorset's egg medium is an admirable medium for both microorganisms.

3. The shape, size, staining reactions and capacity for spore formation of these bacilli are profoundly influenced by the nature of the culture medium.

4. On Dorset's egg medium the majority of the bacilli are typical in shape, uniform in size and gram positive. On media which contain a carbohydrate from which the bacilli can form acid, growth is at first rapid and vigorous but after a few days the bacilli become atypical in appearance, vary greatly in size, and the majority are gram negative.

5. Bacillus aerogenes capsulatus forms spores on Dorset's egg medium and inspissated serum but not on media in which an acid reaction is produced. Bacillus edematis maligni forms spores less readily in acid media.

6. The presence of bacillus aerogenes capsulatus and bacillus edematis maligni is not necessarily associated with the development of gas in the tissues.

7. Bacillus edematis maligni and bacillus aerogenes capsulatus are essentially saprophytic. They have little or no power to multiply in living tissue. In dead tissue they grow rapidly and produce poisonous substances by which the adjacent living tissue is destroyed and rendered a suitable medium for the further multiplication of these bacilli.

8. The bacillus tetani was not found in ulcers made from the discharge in any one of the 18 cases in this series in which it was present.

9. The recognition of bacillus tetani by purely

microscopical methods is complicated by the fact that slender gram positive rods bearing an atypical terminal spore may be occasionally found in pure cultures of bacillus edematis maligni and bacillus aerogenes capsulatus. Moreover, pure cultures of tetanus bacilli especially cultures on egg medium often contain many atypical forms.

10. If broth is inoculated with material from the wound in a case of tetanus and incubated under anaerobic conditions the presence of bacillus tetani can often be satisfactorily demonstrated by animal inoculation. Such a broth culture should be examined at intervals and two or three weeks may elapse before bacillus tetani can be demonstrated.

11. The presence of bacillus tetani was demonstrated in the discharge from the wounds of two patients who did not develop signs of tetanus. Both had received injections of antitetanic serum.

12. The discovery of bacillus tetani in the wounds of a patient who had not developed tetanus would obviously be an indication for one or more prophylactic injections of antitetanic serum. But the practical utility of such a procedure is limited by the difficulty and delay which attend the bacteriological recognition of this bacillus. No bacillus tetani belongs to the same group as bacillus edematis maligni, bacillus aerogenes capsulatus and bacillus edematis maligni. All three have practically a minimum of growth and the conditions favorable to their growth within a wound are probably identical. The demonstration of either bacillus edematis maligni or bacillus aerogenes capsulatus is a relatively simple matter and does not involve much delay. The discovery of either of these bacilli might with advantage be followed by a prophylactic injection of antitetanic serum.

13. A prophylactic injection of antitetanic serum should be given before any considerable operation is performed on a patient with a gangrenous wound.

L. A. I. C. ADL

SURGICAL THERAPEUTICS

Rowlands R. P. Time in Surgery. *B. M. J.* 6 1430

The author makes an appeal for the conservation of time in connection with surgery.

Often a great deal of time is lost in delay and diagnosis or operation is delayed beyond the safety point. A wait and see policy often changes the course of the case. A series of typical cases of appendicitis are reported to illustrate the point.

Avoidance of waste of time in operations is extremely important. This can be accomplished (1) by making all possible preparatory arrangements beforehand in the way of preparation of the patient, instruments, threading sutures, upon which it is before the anaesthesia begins. (2) by improving and simplifying the technique of the operation in every possible way. (3) by not neglecting full attention upon the operation. J. H. SMITH

SURGICAL ANATOMY

Horraz, G. Studies on the Pineal Gland. *Arch. Int. Med.* 9 6 xvi, 607.

Attention is directed to the fact that the clinical aspects of pineal tumors have been abundantly discussed since 1909 when Frankl-Hochwart suggested the possibility of a pathognomonic syndrome. Marburg especially has developed the subject emphasizing the association of adiposity which he regards as an indication of overfunctioning of the gland. The salient factors have been gleaned from reports of about 70 cases of tumors of the gland. Of this number only 2 occurred before the age of puberty and these, therefore, represent the source of evidence of that special train of symptoms, which have come to be associated with pineal disorders, namely premature development in the realm of both primary and secondary sexual characters. In several of these cases moreover principally in the earlier reported ones, the case records are insufficient or wanting and in the others no reference is made to the sex organs, although certain metabolic symptoms are noted. Of these, dispothymia, drowsiness, and polyuria are the most frequent suggesting at once an implication of the pituitary body. The imperfect records preclude any possibility of settling this question at present. Regarding the other cases, of which there are but 10 all but one occurred in young boys between the ages of 10 and 15 years. The exception is Marburg's case, a girl 9 years old.

The author reports three cases from the surgical service of the Peter Bent Brigham Hospital, all of which showed precocious adolescence and growth. A study of the diseases to which the pineal body is subject has been confined almost exclusively to the different varieties of tumors which have been found to arise either from the gland itself or from those structures which lie in its immediate neighborhood and therefore involve the pineal secondarily. Very rarely conditions other than tumor have been mentioned in connection with pineal pathology but these play an inconspicuous and perhaps doubtful part in this chapter of the study of the gland.

From the author's study he gathered the impression that from what is known of the physiology of the normal gland, as well as from the results of Fox and his own experimental observations, that sexual ripening occurs when the pineal ceases to be functionally alive or when it is removed and on this basis he inclines to the belief that the tumor in most of these clinical cases is associated with an inhibition of the normal products of pineal secretion. If this were really the case, however, one would suppose that glandular feeding would postpone adolescence, but from the observations of Dana and McCord the reverse seems to occur. The author's own studies in this direction with the feeding of young guinea pigs and rats were not conclusive and it is a matter which deserves further study. Briefly the author gives the following summary of his work.

1. Extirpation of the pineal in young chickens and lower animals tends to hasten normal maturity.

2. Tumors of the pineal gland in children, occurring before the age of puberty usually give rise to a syndrome characterized by precocious adolescence.

3. Feeding the gland substance to young animals is said to have the same effect as extirpation, but the observations are somewhat inconclusive.

A report of three cases of supposed pineal tumor, one of which was confirmed by necropsy is offered as a further contribution to the study of this gland.

GEORGE E. BRILEY

Vecchi, A. Critical Observations and Experimental Researches on the Regeneration and Neoformation of Lymph-Glands (Osservazioni critiche necroscopiche sulla rigenerazione e la neoformazione delle linfoghiandole). *Chirurgia Milano*, 9 6, V, 90.

The author's experiments were carried out on dogs and rabbits. The basis for the subsequent conclusions were dependent upon the following problems: Could totally enucleated lymph-gland regenerate? Could partially resected lymph-gland regenerate? Could there exist independent of any damaging operation, a neoformation of lymph-glands, and could their number be increased in a given region? The conclusions are as follows:

1. After the enucleation of a lymph-gland there is no regeneration but the formation of a new lymph-gland of substitution.

2. After the partial resection of a lymph-gland cure is obtained with the formation of cicatricial tissue without regeneration of the part excised.

3. In particularly marked conditions it is possible to obtain neoformation of lymph-glands, which increases the number of lymph-glands of a given region, either by proliferation of the pre-existing gland, or by the transformation of the adipose tissue (according to Bayer) or by the development of embryonal germs.

RUDOLF L. VON W.

Hoskins, R. G. The Present Status of the Adrenal Problem. *J. Lab. & Clin. Med.* 9 6 4, 52.

The author reviews the literature during the past ten years and summarizes the work that has been done on this subject. He comes to the conclusion that the fundamental question remains yet to be answered, Why does the removal of the adrenal glands cause death? He believes that the trend of the evidence now available suggests that muscular metabolism is at fault. If that be true the solution like that of many another of the most puzzling medical problems, rests in the hands of the biological chemist.

GEORGE E. BRILEY

Stewart, G. N., Rogoff, J. M., and Gibson, F. S. The Liberation of Epinephrin from the Adrenal Glands by Stimulation of the Splanchnic Nerve and by Massage, Studied by Means of the Denervated Eye Reaction. *J. Pharmacol. & Exp. Therap.* 9 6 iii, 305.

The observations of a number of investigators have indicated that during electrical stimulation of

the splanchnic nerves epinephrin passes into the circulation by the adrenal veins. These observations may be divided into two groups: (1) those in which blood has been collected from the adrenal veins of one animal and tested for epinephrin by its action on the blood pressure when injected into the veins of another animal; (2) observations in which the liberation of epinephrin has been deduced from changes in the blood-pressure or other reactions in one and the same animal.

It is shown in the present study (on cats and dogs) that the response of the denervated eye to stimulation of the peripheral end of the splanchnic nerves is due solely to the passage of a substance in the blood stream from the adrenals to the eyeball. For —

1. When the venous path is blocked the response fails but appears on releasing the block and at the same interval of time as when the vessels are free. The active substance must therefore have accumulated during the period of stimulation of the nerves behind the block.

2. When the heart is stopped by stimulation of the peripheral end of the vagus stimulation of the splanchnics produces no effect on the eye. But on allowing the heart to beat again the eye response occurs at approximately the same time from the moment of re-establishment of the circulation as the time interval between stimulation of the splanchnics and the response with the circulation is going on normally. During the stoppage of the circulation by complete cardiac inhibition accordingly stimulation of the splanchnics must have caused liberation of the active substance at the same point from which it starts when the splanchnics are stimulated without cardiac inhibition.

3. When the circulation is slowed without being stopped as by producing partial inhibition of the heart through the vagus or by hemorrhage the interval between the beginning of stimulation of the splanchnics and the appearance of the eye response is correspondingly increased.

4. It is possible to find a strength and duration of stimulation of the splanchnics with which no eye response will be obtained when the ipsilateral or both carotids are clamped but which will give a response with the vessels free. With longer or stronger stimulation a response is obtained on one side even with the carotids clamped. The amount of the response and its retardation can be varied when appropriate doses of adrenalin are injected into the femoral vein with the carotids clamped.

5. When adrenalin is injected into the left renal vein, the central end of the femoral vein, in a minimum amount to produce an eye response approximately equal to that produced by a given stimulation of the splanchnics the interval of time between the response follows is sensibly the same as that following stimulation of the splanchnics. When the carotids are clamped and the splanchnics stimulated a response may be obtained in the

eye while the clamp is still on or only after its removal or both during the application and after removal of the clamp. There is some variability in this regard in different experiments. There is also a somewhat greater variability in the time interval at which the response appears than in observations in which the splanchnics are stimulated with the vessels free or with the veins clamped. The interpretation of these differences is discussed.

Circulation time measurements show that there is always more than sufficient time for a substance to have been carried in the blood from the adrenals to the eye before the appearance of the eye reactions.

8. The latent period of liberation of epinephrin from the adrenals in stimulation of the splanchnics is short since the time interval after which the eye response occurs is sensibly the same whether it is evoked by splanchnic stimulation or by the injection at the level of the adrenal of a quantity of adrenalin sufficient to elicit a response similar in character and amount.

9. The minimum period of stimulation of the splanchnics needed to liberate sufficient epinephrin to elicit a response in the denervated eye is very brief (a fraction of a second). With a current of given intensity the amount of the response increases up to a certain point with the duration of the stimulation.

10. Massage of one or both adrenals cause definite eye response in an animal in which stimulation of the splanchnics has been causing it and at the same interval of time. When after repeated excitations of a splanchnic nerve the reaction of the eye ceases to be obtained it can still in general be elicited by massage of the corresponding adrenal. But this reaction is soon exhausted.

11. Good eye reactions have been obtained by stimulation of the splanchnics in cats in which attempts were made before the experiment to exhaust the epinephrin store of the adrenals for example by brightening or by administration of morphine. It did not seem that it was easier to exhaust the capacity of the splanchnic nerves for eliciting these reactions in such animals than in animals which were guarded as much as possible against preliminary exhaustion of the epinephrin store by psychological disturbances.

(L. A. E. BEILBY)

Brown, E. D. Observation on the Effect of Epinephrin on the Medullary Centers. *J. Physiol.* 1905, 5.

Brown calls attention to the fact that the slowing of the heart beat is markedly observed when epinephrin is introduced into the circulation in almost uniformly high but not at a very low concentration. The vagus center which is influenced by the rise in blood pressure is rather insensitive to this effect. The question whether epinephrin has a direct action upon the heart is still unsettled and there but little experimental information regarding the

literature which would suggest that the drug might produce a direct stimulation.

The present investigation was undertaken with the hope that some additional facts might be discovered which would aid in solving the problem. The experiments here reported were performed on 23 dogs and a titration of the results obtained on 14 dogs where epinephrin had been introduced showed that in 9 of these there was a slowing of the heart while in 5 it was absent.

The results obtained from the experiments tend to show that when epinephrin is perfused through the cerebral circulation it may in certain per cent of cases cause a slowing of the heart and that this slowing is at least in part due to a direct stimulation of the vagus center. There is certain evidence which strongly suggests the probability that the drug also stimulates the vasomotor center. The effect on the respiratory center is very variable. There is evidence of both stimulation and depression and neither of these effects appears to be governed by the size of the dose of the drug. GEORGE E. BRILEY

Diana G. The Behavior of Some Pancreatic Ferments in the Blood After the Ligation of the Pancreatic Ducts (Sul comportamento di alcuni fermenti pancreatici nel sangue dopo la legatura del dotto pancreatico) *Atti di Nest. path. (ser. di Biologia)* 21: 95, 1915.

According to the researches of W. Hageman if the pancreatic ducts of a dog are ligated after a few hours there is a strong increase of diastase in the urine and in the blood. This reaction has maximum within twenty-four hours after the operation, it remains for some days at this maximum and at the end of eight or ten days goes back to its original figure.

The author's research was carried on in an endeavor to find if in addition to diastase other pancreatic fermenta, particularly lipase and esterase increased in the blood after ligation of the pancreatic ducts. His results confirmed Wohlgenuth.

Regarding lipase he was unable to find it immediately after ligation of the ducts, but he constantly found it in the blood of forty-eight hours up to the sixth day after operation, with maximum on the second day.

Esterase exists in the blood serum before operation and increases notably following it.

W. A. BRIDGEMAN

Robertson, T. B. The Effects of Tethelin: Acceleration in the Recovery of Weight Lost During Inanition and in the Healing of Wounds. *J. Am. Med. Ass.* 9: 617, 1916.

The author gives a brief outline of the method of isolating the growth-controlling principle, which he terms tethelin, from the anterior lobe of the pituitary body. Its chemical properties and physiologic actions. The dried tissue of the anterior lobes of the pituitaries is extracted with boiling absolute alcohol and the solution is evaporated under reduced pressure until solid material begins to separate

out on cooling. To this solution is added one and one half times its volume of dry ether. The substance is thus precipitated and after washing in large volumes of alcohol-ether mixture the above-mentioned proportions it is then ready to be dried and pulverized.

Tethelin is soluble in water and in alcohol, ether, chloroform, and carbon tetrachloride and is insoluble in a mixture of absolute alcohol and dry ether. It contains 5.4 per cent of phosphorus and nitrogen. It is markedly hygroscopic and on standing after pulverization in contact with moist air it darkens perceptibly in color and its iodine absorption value decreases, which decomposition is accelerated by warming but if packed in vacuumated glass tubes and kept perfectly dry it may be heated to a high degree without any perceptible discoloration.

The average yield from each anterior lobe may be estimated to be about 0.05 mg. of tethelin. The action of this substance in doses of 4 mg. per diem administered by mouth twelve between 4 and 60 weeks of age consists in a marked retardation of the early (preadolescent) growth in weight and an equally marked acceleration of postadolescent growth. Mice which have received tethelin are much more firmly and compactly built than normal animals of the same age and it also has a favorable effect on the nutrition of the skin of the animals.

Since tethelin appeared to be a strong stimulator of growth it seemed probable to the author that it might also accelerate that species of internal growth which occurs in the replacement of tissue lost through excessive tissue waste consequent on any circumstance leading to an excessive nitrogen output or curtailment of nitrogen input and accordingly made a series of investigations on 10 male and 10 female mice about seven months of age. The animals were deprived of food for twenty-four hours at the end of which time 5 males and 5 females were given tethelin and all the animals were allowed free access to food. At the end of four hours comparison between the animals which received tethelin and the controls showed that the administration of tethelin led to a very remarkable acceleration of the regain of weight following the administration of food.

The author also made experiments to see the effect of tethelin upon another form of tissue repair—the healing of wounds, and while as he states experiments on animals and especially on mice do not afford the most satisfactory means of investigating this process, his results were so favorable as to justify his opinion that tethelin when administered hypodermically to mice repairs remarkably stimulating action on tissue repair as expressed in the healing of granulating wounds. GEORGE E. BRILEY

RADIOLOGY

Kuegler, F. H. Radio-Activity as a Therapeutic Agency. *Med. Herald*, 9: 61, 1916.

After reviewing briefly the event which led to the discovery of the roentgen ray and such radio-

active elements as uranium and radium the author describes their applicability as therapeutic agents. Regarding their relative values he states that they are practically identical in their action, differing only in the quality and quantity of the rays produced. The choice of one or the other depends upon the anatomical location of the diseased tissue and the peculiar requirements of the case to be treated. He lays stress on the matter of proper dosage and technique if beneficial results are to be obtained.

Among the conditions mentioned in which radioactive treatment was found to be particularly useful, were enlarged lymphatic, tuberculous and lymphomatous glands, dysmenorrhea, uterine hemorrhage and fibroids at or near the menopause yielded uniformly good results. Chronic joint diseases and even some selected cases of tuberculous joints showed a fair percentage of cures or improvement. In the latter cases the author believes that the simultaneous use of Bier's hyperæmia treatment enhances the effect of the irradiation. In exophthalmic goiter the results were so favorable that he believes with Sielmann and Schwartz that it is to be preferred to surgery where simple medical treatment has failed.

Regarding the use of radio-activity in cancer the author quotes a summary from an article by Russell to the effect that its use in no wise should supplant operation unless it be in the removal of certain superficial growths but that it be used rather as an adjunct to surgery.

WOLFE HARTMAN.

Perkins, G. W.: The Normal Stomach; Its Size, Position, Form, Tone, Peristalsis and Mobility from a Radiographic Standpoint. *Med Press* C C 96 3 258.

After an examination of 58 normal stomachs radiographed in the vertical position and filled with an opaque meal of buttermilk and bismuth subcarbonate, Perkins draws the following conclusions:

1. Peristalsis does not seem to exert any influence on the tone of the stomach, for we may have exaggerated peristalsis with a hypotonic stomach and diminished peristalsis in a hypertonic stomach.

2. There are no determined fixed points of any type of stomach in the abdominal cavity except the cardiac portion. A stomach may be of any of the types and yet be normal from an X-ray standpoint.

3. The average normal stomach is orthotonic. The usual position of the orthotonic stomach is as follows: greater curvature (lowest point) one to two inches above the interspinous line; lesser median or to the left; lesser curvature (lowest point) three to four inches above the same line; median or one to two inches to the right. The pylorus is placed two or three inches above the line in the median position or one and a half inch to the right. The axis of the stomach is vertical and parallel to the median line. The length is eight to ten inches and the width three to three and a half inches.

4. The tendency of the male stomach is always toward hypertonicity while that of the female is

toward hypotonicity. The stomach is not as full as high in the abdominal cavity as many textbooks of anatomy teach. There is no structure in the human body however that has such variation in form, tone and position.

5. Radiographic examination with the fluorescent screen or plate is the only method of ascertaining the anatomical position of the stomach, its peristalsis and mobility in the living individual. Therefore bearing in mind this fact the physician should be observant of the limitations of the technician in locating pathologic lesions of the stomach that is if he has not a ray of the stomach. Such a chart should also be carried by the radiologist technician in locating intestinal growths.

Herniman Johnson F.: The Uses and Limitations of Stereoscopic Radiography in the Diagnosis of Injury to Bone the After Treatment of Fractures as Carried Out in the Electrical Department of the Cambridge Hospital. *Aldershot P. L.* 1 42.

The method has been employed in orthographic work. It is neither complicated nor employed to the exclusion of the well known procedures as for internal fixation of foreign bodies. It is essential in the diagnosis of injuries to the shoulder, spine, pelvis and hip. In these regions plates in one plane may be misleading and the whole picture is by the stereoscopic view is the only means of checking the ofttimes misleading appearance of an ordinary plate. By reversing the plates in the stereoscope an appearance is produced if one were looking at the other side of the bones under examination. A bone or joint is never explored radiographically until four sets of stereograms have been taken, anteroposterior, posteroanterior, right lateral and left lateral. By means of which plates a general view of the relations of the various bones can be obtained yet one must remember that the exact relationship of distances will be distorted. It is usually possible to say whether a bullet is at one side or the other of the bone or buried within it and to determine the relative position of fragments but the stereoscope must not be regarded as an instrument of precision for localization purposes.

The author finds that the use of electricity in the after treatment of fractures is a distinct advantage where massage and passive motion have not restored the member to normal use. He advises a combination of galvanism with a mild faradism in the form of baths. With a continuous current of 20 to 30 milliamperes used for 20 minutes daily the faradic current must not be of sufficient strength to cause any distinct muscular contraction. Massage and muscular exercises must be used in conjunction with the electrical treatment if the best results are to be obtained. Fractures in the neighborhood of the elbow, wrist and ankle will give a normal result.

under this method within a month to six weeks. Where weakness is complained of in the limb consequent to fracture the author advocates rhythmical electrical stimulation by the faradic current preferably by a Lewis-Jones electrical apparatus arranged to give at least 20 impulses a second. Such condition of weakness may occur after prolonged immobilization in which all the muscles in the vicinity are affected, or where through faulty position a particular muscle group has been over stretched. In the latter case, a relaxation splint is essential for cure. In general up to a certain point the parietic phenomena are no doubt largely physical, but there is from the first certain mental element present, a kind of failure of memory as to how the lost movements are to be provoked, in other words, a lack of action patterns in the memory of the movement of the affected part. Stimulation of the individual muscles electrically therefore, has its greatest usefulness under such conditions. There is a type of pain complained of following fractures, where the presence of the limb has become quite normal again and the movements good. The patients describe it as being like toothache. It is made worse by exercise and often keeps the patient awake at night. The application of the high-frequency current by the vacuum electrode, at first on the skin and later at sparking distance, gives relief in a few days. In case pain is not relieved careful X-ray examination, with view to the possible detection of some definite cause as the presence of a small bony cavity in the middle of the reformed bone should be undertaken. X-rays are often of value in relieving pain and causing the disappearance of previous fibrous accumulation. HARRY C. SLOW.

Turner D. Report on the Radium Treatment at the Royal Infirmary Edinburgh, During the Year 1915. *Edinburgh Med J* 9 6 1, 1916.

Some interesting points have been presented in this detailed report of 64 cases treated during the past year 24 of which were malignant and inoperable of this class 8 being sarcoma in which better results are to be expected if they are favorably situated. He also found carcinoma of the vagina and cervix would usually yield if localized but recurrence after a variable length of time was the rule. However during the interval the patient enjoyed relief from pain, gained in weight, and was in fair health. A preliminary curettage is often of great service. Screening has been found unnecessary in these cases, except to protect the healthy tissues the dosage should be at least 3,000 milligram hours. In rodent ulcers the results are invariably good, and if they recur it is usually due to insufficient primary treatment. The cosmetic result leaves nothing to be desired. For this reason Turner has employed it in the treatment of papillomata, naevi, and recent cheloids. Nine cases of exophthalmic goiter were treated two of them being males. While there was very little change in

the gland, in fact in one instance it became larger yet the treatment had some influence upon the general system, for the symptoms were controlled and the health was greatly improved. In these cases a .4-mm. silver screen was used, 20 mg. of radium bromide being placed 2 cm. from the skin and left in place for twelve hours. Under these conditions no damage was observed to the overlying integument. This treatment was repeated in 3 or 3 months.

The author believes that while the field of utility for the use of radium is limited its value in certain well-defined directions has been firmly established. W. S. NEWCOMB.

Beck, E. G. An Accurate Method of Localization of Foreign Bodies in the Chest and Their Removal. *Internat. Med J* 9 6 xiii, 1916.

The author discusses the value of stereoscopic radiograms in locating foreign bodies particularly stress being laid on the fallacy of attempting to determine from a single radiogram the exact location of foreign bodies, as well as the fallacy of attempting to form a correct view of the position of fragments after fracture. To illustrate this point the author placed a bullet on the center of the sternum. Two radiograms were taken without changing the patient's position but the X-ray tube was shifted to a different angle. On each picture the bullet appeared to be in a different location. The cases cited by the author attest the value of the method. In one instance a would-be suicide shot herself with a .45-caliber pistol. The bullet from a single radiogram seemed to be in the axilla. The stereoscopic readings showed the bullet to be against the scapula. It was found there. Beck uses the method in intestinal work in studying diseases of the cecum, sigmoid, and in estimating the depth of empyema cavities and fractures.

LEONARD CORRY

Millwee R. H. Five Hundred Gastro-Intestinal Examinations by Roentgen Ray. *Texas Med J* 9 6 xiv 45.

Millwee reports upon 500 consecutive gastro-intestinal examinations by the roentgen ray with a barium sulphate meal suspended in artificial butter milk. The roentgen diagnoses in these 500 cases were as follows:

Duodenal ulcer	1
Pyloric atony and stasis	143
Appendix involvement	04
Gastric ulcer	48
Gall bladder involvement	30
Gastric cancer	38
Miscellaneous	10
Negative findings	29

The author was able to follow up 80 per cent of these cases with the following checking. Of the cases operated upon for duodenal ulcer a lesion was found in the duodenum in all but one case.

this case had gall-stone with adhesions. Of the cases treated for duodenal ulcer all responded to treatment except 11.

Fifty per cent of the positive appendix cases were operated upon all of which showed involvement. In the cases of gastric ulcer and gastric cancer all of the cases operated upon revealed either an ulcer or a cancer with the exception of one case in each group which showed gall bladder disease with adhesions.

L. H. SKINNER.

MILITARY SURGERY

Mullally G. T.: A Case of Tetanus like Spasm Localized to the Wounded Limb. *Lancet* 1914, 96, 867.

Mullally describes a case of shell wound of the lower end of the femur which necessitated amputation. The case was complicated by gas infection which necessitated extensive opening up of the thigh. A few days after the injury twitching in the stump began and grew progressively worse the spasm becoming so painful that chloroform had to be given to control the pain. The author thought that he was dealing with an ascending neuritis in the stump and resected the antero-crural and sciatic nerves without relief. The patient died on the tenth day at which time the facial expression was suggestive of risus sardonius. A prophylactic of 1000 unit of antitetanus serum had been given the day of the injury. The author feels that the case was one of tetanus although there were no general spasms.

F. D. DICKSON.

Weinberg M.: Gas Gangrene in the Present War. *Medical Journal* 1914, 96, 1000, 24.

Gas gangrene has been especially prevalent in the present war. The bacteriology of gas gangrene has been carefully worked out. The bacillus aerogenes capsulatus otherwise known as bacillus perfringens is found in nearly all cases. Only in exceptional cases however is it found alone other organisms being usually associated. These other organisms may be diplococci, streptococci bacillus proteus and bacillus sporogenes. Another common form of organisms occurs in which the bacillus of malignant oedema (vibrio septique) is the pre-dominant organism. Other organisms are usually associated with the vibrio septique which is a relatively rare agent in gas gangrene being found in only 4 out of 100 cases.

The toxic form, the bacillus oedematis is found associated with the bacillus perfringens and vibrio septique in the classic form of gas gangrene. From the foregoing it is readily seen that most of the organisms related to the production of gas gangrene belong to the intestinal flora.

Gas gangrene was produced experimentally in the following way any of the above mentioned organisms. In the production of gas gangrene it is necessary to inject a relatively large number of organisms. There must be some contributory cause

to account for the small number of bacteria necessary to produce gas gangrene in wounded soldiers. The dissection of limbs amputated to gas gangrene has demonstrated that the gangrene is not due to the presence of organisms but is a result of the obliteration of the main vessel by the organisms of gas gangrene and this a very fertile soil for growth. Another factor is the importance in the production of gas gangrene of injury to tissues especially to muscle. Experimentally it is very easy to induce thrombosis and artificial injury to muscle with a rubber question.

The treatment of gas gangrene in the early stage is the treatment of wounds which are probably infected. The wound should be thoroughly washed with all germicidal material and kept as wide open as possible. Continuous irrigation with normal saline solution or hypotonic salt solution or sterile insecticide is recommended.

The polyvalent serum of Coleman has been found to have a protective effect in wounds infected especially by gas gangrene. In the opinion of the author the best treatment is one prepared with the serum and antitoxin and an aerobically that are found in the wound to be treated.

Early amputation is often necessary and is considered necessary in many urgent cases. The actual cautery over the whole extent of the infected area. Free incision or a matter of time treatment. Unfortunately many cases result fatally in spite of the best that can be done. J. H. SKINNER.

Lansdown R. G. P.: Removal of Bullets and Other Metallic Foreign Bodies. *British Medical Journal* 1914, 96, 1000, 24.

There are four points which should be emphasized in the localization of bullets by X-ray. (1) Every case should be carefully screened by a skilled skiagrapher accustomed to the work of localization. (2) In determining the direction of the intral ray the smallest diaphragm must be used. (3) It is essential in all difficult cases that the operator should be present when the localization is made as it is of paramount importance that the patient should be in the same position for operation as when the localization was carried out. (4) The localization should be made as short a time as possible before operation owing to the liability of the metallic body shifting its position.

The skin is then marked by a small cross made with a sterilized surgical needle. The patient is taken immediately to the operating room and the following procedure is carried out. A telephone apparatus is connected one electrode being placed on the sound limb of the patient the other being connected with a sterilized probing needle. The needle is inserted at the cross mark on the skin in the direction of the for ign body. When it touches the foreign body the circuit is completed and a distinct tapping sound is heard at the telephone receiver. A small incision is then made, and the

Isnardi, L. Treatment of Septic Wounds Without Drainage (Cura di Bo ferite di guerra atliche senza drenaggio). *Glor d'Accad di med d Torino* 9 5 lxxviii 430

Isnardi is opposed to the employment of drainage in the treatment of septic wounds. Of 290 wounds treated by him in the Reserve Hospital of Vercelli 3 were very grave and septic. Most of them were fracture wounds. The treatment consisted in clearing the wound, immediate reduction of the fracture with traction apparatus, immobilization of the articulation, examination with sound, radioscopic examination only, no searching for no extraction of picule, etc. unless apparent, no manipulation, plentiful use of gauze and absorbent cotton, immobilization and elevation of the limb. No drainage whatever is used. All the 3 cases have recovered with preservation of their limbs.

Isnardi is of the opinion that drainage and incisions disturb the progress of the reparatory process. Drains, whether gauze, rubber, glass, or foreign bodies, irritate the tissues and give harboring stronghold and breeding place to microbes. Incisions expose damaged tissues which would better recover under an intact skin. Drains do not favor the elimination of poisons. The traumas made by the projectile all ways offer better pathway. W. A. BRYAN.

Saint C. F. M. The Principles of Treatment and Their Application to Wounds. *Brd II* 1 9 0 4 30

The principles of treatment are (1) remove the cause (2) combat the effects (3) assist the reaction (4) prevent complications or deal with them if they have arisen.

Removal of the cause depends upon the location as to the probable presence or absence of infection. A superficial metallic body should be removed. When deeply placed it should not be removed unless there is probability of infection and proper X-ray equipment is at hand to aid in its localization. Under special circumstances even sterile bullet may need to be removed for example when from its position it gives rise to irritation of nerves interferes with the movements of joint, etc.

In combating the effects the general condition of the patient is extremely important. Quiet and freedom from pain, secured if necessary by morphine, are absolutely essential. Stimulant must be given with caution, small doses frequently given being preferable to large doses. Transfusion is the chief remedy, saline being usually used preferably by rectum or subcutaneously but occasionally intravenously.

The treatment of the local condition in case of hemorrhage either by pad and pressure or by pressure ligature, or vessel suture. The importance of ascertaining that no tourniquet is left on limb too long is emphasized.

In assisting the reaction the course followed depends upon the condition of the wound when the

case arrives. Since most cases are infected, antiseptics are first used and the wound thoroughly cleansed. Aseptic wounds may be closed and primary union secured.

The complications are numerous, one of the most important being sepsis. This is combated in numerous ways, many antiseptics being used. Hypochlorous acid is the most popular at present. Efficient drainage, lymph lavage secured by hypodermic solution and Bier's hyperemia are all important in hastening recovery. The general resistance should be supported by fresh air, quiet and plenty of nourishing food.

The following rules have been elaborated by the author for the treatment of head injuries.

1. The wound was dressed, the lotion used for the removal of the old dressing being in 20 carbolic. Mercury perchloride was contra-indicated because odine had invariably been used lavishly often producing blistering. If further investigation proved to be necessary the wound was packed with spent gauze wrung out of 1 in 3,000 mercury boric acid.

2. An anesthetic was administered.

3. The head was washed in 20 carbolic lotion, and the hair shaved off while the carbolic was dripping, and following the razor.

4. The bruised edges of the wound were trimmed with mouse-toothed forceps, knife and scissors, and the wound dried and swabbed throughout (including exposed brain) with pure carbolic. All more extensive wounds the excess of carbolic was neutralized by methylated spirit otherwise it was mopped away.

5. A large flap was reflected usually with the wound in its center.

6. The skull was trephined, all loose depressed bone removed, and projecting edges nibbled away. No extensive search was made for distant pieces of bone or foreign body. Bleeding was treated by fine suture muscle tissue or packing.

7. Exposed brain and dura mater were covered with spent gauze wrung out of 1 in 3,000 mercury boric acid, the free end being pulled through the original wound. A tube was introduced in some cases.

8. The operation wound was sutured with silk worm gut.

9. Three days later the gauze was removed, the tube might or might not be removed. If left it was removed at the next dressing.

Where the original wound resembled an incised wound, secondary incisions were inserted on the fifth or sixth day. In punctures this was not necessary and in extensive lacerations and destruction it was not possible. J. H. SCILES.

Sorrel, A. L. Painless, Rational, and Economical Treatment of Wounds (La cura indolore, razionale, ed economica delle ferite). *Glor d'Accad di med d Tori* 9 5 lxxviii 404

Sorrel claims many advantages in the use of paraffin in the surgical treatment of wounds, both

tion. The physiological integrity of the splanchnic vasomotor system and of the musculature of the abdominal wall form the chief only extraneous limitations to expansion of the great abdominal reservoir.

The splanchnic vasomotor mechanism is sufficient to compensate for the effect of gravity on the blood supply of the brain. Deficient vasomotor tone combined with a tonic condition of the abdominal wall of a patulous abdomen must in the erect posture lead to deficient circulation in the brain and cerebral anemia, as well as oligemia of the general circulation.

In the normal subject the fall of carotid blood pressure which tends to occur on changing from the recumbent to the erect posture leads to stimulation of the splanchnic vasomotor center at the same time the tension of the muscles of the abdominal wall is apparently increased as is evidenced by the difficulty found in making a satisfactory palpatory examination of the abdomen with the patient upright. In these ways the hydrostatic pressure tending to surcharge the splanchnic veins is compensated, so that with the venous efflux from the brain accelerated by gravity and the arterial inflow kept high by elevation of systemic arterial pressure the nourishment of the brain may be expected to flourish in the erect posture.

In the debilitated individual we must expect to witness the preponderance of gravity effects proportional to the weakening of the physiological powers which had held the compensation. Now in the erect posture the blood actually stagnates to a degree in the splanchnic veins at the expense of the systemic circulation and the blood pressure in the brain falls.

In the group of complaining more or less healthy looking women in whom it is difficult to localize the pathological condition and which the physician commonly characterizes as neurasthenic measures taken to support the abdominal circulation often seem to give better result than any other whether or not there is evidence of enteroptosis.

The one physical sign which seems indicative of general, and especially of intracranial hydrostatic circulatory deficiency is to be found in the postural changes of the blood-pressure. In the normal person in the erect (least) sitting posture the blood pressure is higher than when recumbent. When the blood-pressure, especially the maximal are found higher in the recumbent than in the sitting posture Sewall concludes there is physiological weakness either of the splanchnic vasomotor system, of the abdominal wall, both, and that potential cerebral anemia and vasomotor overstrain are consequences in the erect posture.

The treatment of abdominal circulatory tasis consists in respiratory and resistance exercises each exerted followed by a period of rest in the recumbent posture. Both with alternating temperatures, combined with massage have favorable effect. The subject should lie down for an hour after each

meal and during the latter half of this period a bag of shot weighing ten to fifteen pounds should be placed on the abdomen. Exercises especially adapted to strengthening the abdominal muscles should be employed, such as the rowing machine. To relieve morbid symptoms in the quickest way an artificial support such as a belt band or corset should be applied over the lower abdomen.

Sewall concludes that plain harness is potentially present and may be the starting-point for vicious circles of derangement in every case of general functional collapse. Laxness of the abdominal wall probably leads in the erect posture to the establishment of a negative pressure within the abdomen, which it is the primary object of treatment to correct. Depletion of the intracranial blood current must follow insufficient compensation of the hydrostatic pressure involved in the erect posture. Virtual anemia of the brain leading to multiplicity of disorders is the natural sequence. It is probable that excess of blood pressure in the recumbent as compared with the erect posture is a trustworthy index of placid nervous system.

MEDICOLEGAL, HOSPITAL, MEDICAL EDUCATION

Malpractice; Expert Evidence as to Treatment;
Patient's Duty to Minimize Damage.
Rev. 9-6-11 608

The case of *D. H. Wagner v. P. 1979*, was that of a mutual doctor for malpractice in which the plaintiff succeeded in obtaining a verdict against the defendant physician. The facts are briefly reviewed as follows:

The plaintiff, a workman, sustained injuries to his foot on a long of dislocation of one of the bones and other injuries and bruises. The defendant physician was called to treat the plaintiff's injury and was called the hospital fee was \$100. Infection followed the wound and the plaintiff was confined in the hospital for over six weeks. After leaving the hospital he called a number of times upon the defendant to treat him. At these visits the defendant advised him to use the foot and do some light work and told him that he would probably have a good foot. The dislocated carpal bone was pressed downward and forward to such an extent that the protruding end of the bone carried the weight of the body causing pain. The specific allegation of the defendant's negligence was that the defendant had neglected to properly reset the bones by manipulation and had failed to perform an operation by cutting the foot open and forcing the dislocated bone back into place.

The jury returned a verdict in favor of the plaintiff and the trial judge set aside the verdict and entered judgment *no obstant verdictum* for the defendant. The case was appealed by the plaintiff and an appeal of the above facts were practically undisputed.

The main point in issue was: Was the defendant guilty of malpractice in not attempting to set the dislocated bones by manipulation the time passing when this should have been done? Should the defendant have performed an operation? A medical expert for the plaintiff expressed the opinion that if there was swelling and infection during the acute stage, an effort should have been made thereafter to restore the functions of the foot, the presence of the swelling and infection would prevent resetting or operation during the acute stage. The sooner the swelling was reduced the better. Medical experts for the defendant testified that it would have been foolhardy to attempt to reset the bones in any way until all danger of infection had passed and the wound healed completely, that the cutting of the tissues prior to this time would have been hazardous, that the bones would not have remained in place if set, that an operation might have made the dormant infective germs active, threatening the loss of the foot and possibly the life of the patient, that the duty of the operating or attending surgeon was first to look to the life of the patient. They testified that the services of the defendant were in keeping with the proper teachings of surgery.

The reviewing court says in substance that when the unimpeached testimony of doctors of equal skill and learning disagree on a given state of fact, the courts cannot hold to the theory of one to the exclusion of the others, that if a number of witnesses recognize the method of procedure as proper and approved, the court could not hold the surgeon guilty of malpractice, giving reasons as follows:

That a surgeon is called upon to exercise only reasonable care, learning and diligence in his profession and that he uses a method recognized and approved by

members of his profession of equal learning and standing, he should not be held liable for mistake, nor will the court deem a man guilty of malpractice where doctors disagree as to method, if it is not even though a more modern method than the adopted is suggested, a third party is not the duty of the attending surgeon to do that is reasonable within the limits of professional skill to relieve pain and suffering.

The question then arises: Did the defendant in the case at bar violate any duty to the plaintiff after the plaintiff had left the hospital? The court holds that although the defendant, together with the employer of the plaintiff, made it known to the plaintiff that the hospital had left the plaintiff was continuing a continuing duty to the plaintiff, reasonable professional duty, although not clearly stated, that an operation might be necessary and a full proof of the duty of the plaintiff, so far as the plaintiff was concerned, was offered to show that the reasonable duty of the operation would amount to \$500.00, the jury therefore directed a judgment for the plaintiff for \$500.00. However, the plaintiff was not held liable for the pain and suffering resulting therefrom. The reason was that the defendant was not liable for the original injury, being not liable for proper care and treatment until the time the plaintiff left the hospital, he was not liable for the pain and suffering resulting therefrom. He was under a legal duty to minimize his damages. It followed therefore that he could not recover to the extent of pain and suffering because it was his duty if he thought he had been malpracticed to have the operation performed and bring suit for the reasonable costs thereof.

L. A. CATANIS

GYNECOLOGY

UTERUS

Carvalho C. The Technique of a New Procedure for Subtotal Abdominal Hysterectomy in Cases of Uterine Fibroma or Inflammation of the Adnexa. *S. g. Gynec. & Obs.* 96 viii 64

For some time past the author has performed subtotal abdominal hysterectomies in cases of uterine fibroma or inflammation of the adnexa by what he considers an improvement of various methods already known. The improvement in his method he claims to be founded on the fact that the circulation of the uterus and the adnexa is controlled by means of the forceps.

The technique is as follows. After median laparotomy incision is made, the uterus is pulled as high as possible with the hysterostat and the finger is directed toward the pubis.

The thumb and the index finger of the left hand grasp the broad ligament just outside the adnexa and seek the cervix through the walls of the vagina ascending slowly from there to the point where the beating of the uterine vessels is felt. The right hand seizes the fundus of the uterus with the finger and compresses the area covered by the thumb and the index finger of the left hand. The whole breadth of the broad ligament is thus compressed above the point of the finger which touches the borders of the cervix and the forceps are slightly but tightly locked to completely close the three arteries of the uterus.

The section of the broad ligaments and the cervix is carried out from left to right following the edges of the forceps. The ligation of the uterine arteries is made directly if the ends are still visible, if not by U-shaped ligature below the forceps. The fundular and the ovarian arteries are ligated connected with the peritonization.

The peritonization is made with catgut and pedicle needle. The needle is passed all around the stem of the pedicle of the uterus in the peritoneum; the loop is closed and the ovarian vessel ligated. Still here are then made in any that spirals formed by the catgut enclose both the borders of the remaining part of the broad ligament and the forceps compressing this part one of these spirals encloses the artery of the broad ligament. When the cervix is reached the forceps are removed and the catgut pulled just as if it were a curtain string. The ligature and peritonization of the cervix and of the other half is done the same way.

The disadvantages of the method are: (1) the use of few instruments, (2) the absence of bleeding, (3) the ease with which the peritonization is accomplished and (4) the avoidance of injury to the uterus and the bladder.

Laroque G. P. The First 118 Cases of Operation for Posterior Displacement of the Uterus. *Am. J. S. g.* 96 xvi 5

In the 118 cases that furnish the basis of the author's report suspension was performed 7 times. In the early cases by the Gilliam technique, but by the so-called Kelly method in a few the temporary suspension of Ochaner was used and, as a part of the treatment of extensive suppurative disease in one case, the uterus was held up as a result of tightening the broad ligaments incident to removal of the uterus. In one case hysterectomy was performed. 93 cases of this group the J. H. Hoston-Wallis operation was employed.

This method has given complete satisfaction. It conforms to the standard principles necessary in performing operations to produce a normality and is what the author calls the anatomical method. It is followed by the least painful and convalescence and the least end result both as to position of the uterus and the relief of symptoms, have been perfect. All the cases have been followed at least three months and most of them examined again. Some report have come from patients and from doctors many cases after from three to five years. Many of the women have given birth to children. The operation without difficulty. Dilatation of the cervix was performed. If current was necessary in good number of cases. Kernal's catheter of the cervix perineum both was necessary. 58 of the 118 cases. Removal of the tube or of an ovary of an ovarian cyst in conjunction with suspension has been recorded in 4 cases. In 4 cases myomectomy was performed for benign uterine tumors. The procedure was invariably removed in every case. When the abdomen was opened the uterus was found to have been previously removed. Seventy-eight cases showed disease of the appendix. There has been no mortality either from the disease or from the operation.

EDWARD L. CORNELL.

Kellogg, J. H. A Simple Method of Shortening the Round Ligaments of the Uterus for the Cure of Retroversion. *Med. Rec.* 96 l xvi 79

The method which the author describes has been used by him for more than twenty-seven years. He has employed it in more than 600 cases and many other surgeons also have used it extensively.

In this operation almost without exception curettage is required when the uterus has been long retroverted as a pathological condition of the endometrium is almost invariably present.

When the pelvic floor is greatly weakened, result

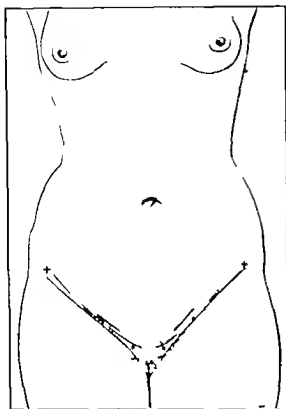


Fig. Skin incision (a-a)

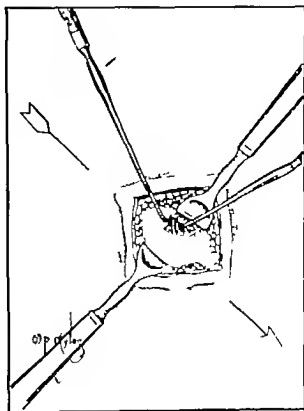


Fig. Poupart's ligament

ing in rectocele or cystocele these conditions must be corrected by a plastic operation.

Before or after the curettage the uterus is carefully replaced by bimanual manipulation. Great care must be taken to see that both the uterus and the appendages are brought well forward. When released the uterus should remain in position. If it falls backward at once or settles down into a retroverted position adhesions are probably present.

When marked antelexion or retroflexion exists a stem pessary is introduced. A carefully fitted lever pessary is placed to support the fundus and to prevent all straining upon the ligaments. The pessaries are usually retained for two or three months while the intestines are becoming readjusted and the abdominal walls strengthened.

A separate incision is required for each ligament (Fig. 1) and it is important that the incision should be made at the right point. With the finger in the middle of Poupart's ligament the incision is started at a point about one centimeter nearer to the pubic spine and two centimeters internal to the ligament of Poupart.

After the skin has been incised, the remaining dissection is made entirely with the blunt hooks. The two points of the hooks are placed together in the center of the wound, pressed into the tissues and separated by drawing toward the angles of the wound. By lifting the angles of the wound with the hooks the wound is made to gape and the retractors are then introduced. First one then the

other this procedure is repeated a many times as may be necessary to reach the aponeurosis of the external oblique. When the aponeurosis first comes into sight it must be divided and drawn aside by the retractors in order to bring Poupart's ligament plainly into view.

Fixing a point along the ligament about one third the distance from the pubic spine to the anterior superior spine of the ilium one centimeter internal to this point a puncture is made through the roof of the inguinal canal with the blunt hook held in the left hand and the tendinous fibers of the aponeurosis are split for about one half centimeter and the other hook introduced with the point turned outward toward Poupart's ligament. The hook is dipped close beneath Poupart's ligament and whatever the hook engages is carefully pulled up (Fig. 2). If the ligament does not appear the hook is introduced again and made to explore the tissues one or two centimeters in each direction along Poupart's ligament. If the ligament is not discovered the hook is turned inward and an effort made to find it beneath the outer border of the internal oblique where it is sometimes found.

The round ligament may be recognized by the following factors: (1) It is a distinct structure. (2) It differs in color from other structures, looks white like a tendon although not quite so smooth and glistening as a tendon. (3) Over the surface of the ligament small tortuous veins may be seen which disappear when traction is made upon the ligament.

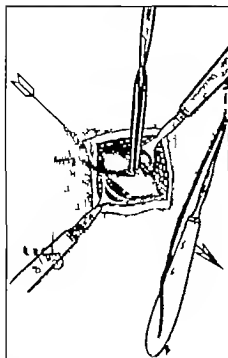


Fig. 3. Ligament fully drawn out and peritoneum stripped off.

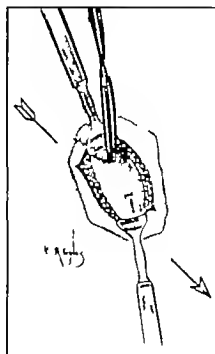


Fig. 4. Ligament drawn out above the external ring.

and fill when the tension is relaxed. It should be noted that these veins are sometimes greatly enlarged and varicose. (4) The ligament is pulled out more easily than other structures. When, however, the nerve which comes with the ligament is caught with it by the hook, the ligament is held back somewhat but by separating or cutting the nerve the ligament may be very easily drawn up and does not snap back into the canal as do other tissues when released.

Failure to find the ligament may be due to several causes.

The ligament may be drawn down under the internal oblique to an unusual degree by long continuous and excessive strain.

In very stout persons the ligament may be buried in fat in the lower part of the canal.

3. The ligament is sometimes obscured by a mass of veins, due to a condition analogous to varicocele in men.

4. A more common cause of failure is incorrect placing of the incision or of the puncture through the roof of the inguinal canal. The ligament must be sought in exactly the right spot as above described. If the hook is introduced even one centimeter away from the proper point the ligament will be found only with much difficulty.

The ligament should always be sought at the outer border of the internal oblique and should be

drawn out from under the muscle instead of being pulled up through it.

5. The ligament is sometimes so slender that its recognition is very difficult. Small ligaments are most likely to be found in poorly developed women who have not borne children and in whom the uterus is retroverted to an extreme degree.

6. The ligament is sometimes so large that it is not readily caught by the hook and one is sometimes surprised after several minutes of fruitless search by the sudden appearance of a large strong ligament, fully half an inch or more in diameter.

7. The ligament is sometimes invested by fascia and fat and not so easily recognizable as in normal cases.

8. Anomalous conditions of the ligament are sometimes though very rarely found. In 1,603 cases the author has encountered conditions which may fairly be regarded as anomalous in not more than half a dozen instances.

9. Occasionally the ligaments are held back by adhesions, the result of pelvic cellulitis involving the round ligaments.

The ligament should not be seized with forceps. Traction is made while the pouch of peritoneum, which forms the canal of Nuck, and other tissues are separated and pushed back along the ligament with narrow-bladed forceps which are not released when the peritoneum is fully stripped back but remain attached as one pair after another is used.

As the peritoneum is stripped off the ligament may be pulled out more and more until finally so much resistance is felt that the uterus appears to be drawn up against the abdominal wall in the suprapubic region. The ligament will be seven to nine centimeters in length representing a shortening of fourteen to eighteen centimeters. No matter how slender the distal portion of the ligament may be the proximal portion at the point where it emerges from the canal will show a width of half a centimeter to three centimeters.

The ligament having been fully drawn out (Fig 3) the next step is to attach it at its thickest part to the aponeurosis of the external oblique at the upper angle of the puncture by means of a strong chromicized gut suture passed from beneath the aponeurosis. A ligature is now applied to the shreds of peritoneum held by the forceps. This closes the canal of Nuck and also ligates vessels which might be a source of trouble.

If the ligament is anchored in this position by attaching the loop of surplus ligament to the anterior surface of the external oblique muscle the patient may possibly sooner or later develop hernia as the small intestine will gradually work its way out alongside the round ligament. To obviate this danger the loop of ligament is drawn back into the canal and pulled up through the aponeurosis at a point five or six centimeters higher up and toward the median line. To accomplish this an aneurysm needle is passed into the canal along the inner side of the ligament and made to emerge at a point five or six centimeters higher up and two or three centimeters toward the median line. About an inch of the loop of ligament is passed through the silk loop and the ligament is drawn back into the canal and up through the aponeurosis. By this means all danger of hernia is eliminated (Fig 4).

The end of the loop of ligament is again drawn under the aponeurosis of the external oblique and made to emerge at the original opening through which it was first pulled out. Thus the surplus ligament is woven into the aponeurosis of the external oblique to which it in a few days becomes firmly attached forming a very secure and permanent anchorage for the ligament (Fig 5).

The next step is to close the opening in the roof of the canal. Care is taken to pass the suture through the end of the loop of ligament so that when the opening in the aponeurosis of the external oblique is closed the ligament is closely applied to the under side. The roof of the inguinal canal is thus reinforced instead of being weakened.

The superficial fascia is closed with No. 1 plain catgut and the edges of the skin incision are approximated by two or three skin clips.

The advantages claimed for this method of operation over other methods are:

1. The abdomen is not opened hence there is no risk and no risk of formation of peritoneal adhesions and no abnormal conditions created which might lead to intestinal obstruction.

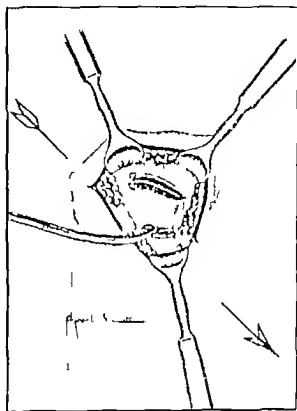


Fig. 5. End of ligament drawn through inguinal opening into roof of canal.

2. The ligament is so secured that the recurrence of prolapse is almost impossible. In the original method of Alexander the ligament was cut off and attached to the fascia about the spine of the pubes. This method did not give secure anchorage and frequently resulted in complete failure because the ligament tore loose.

3. The ligament is not injured and no mutilation of any sort occurs so the patient cannot possibly be made worse as not infrequently occurs with several other methods.

4. The technique is simple and the operation may be quickly done. The time required is rarely more than fifteen minutes and often only ten or twelve minutes for both sides.

5. The small and superficial incision and the short time occupied by the operation give no occasion for shock.

6. The operation does not give rise to complications in pregnancy as do some other methods.

7. The results when the cases are properly selected are better than those obtained from other methods.

Conditions which contra-indicate shortening of the round ligaments by this method are:

1. Prolapsed uterus in which the ligaments are not strong enough to sustain the weight of the entire abdominal contents and a more radical procedure is necessary.

3. The absence of symptoms as in cases of retroversion of long standing in which the uterus is small and free from disease as often noted in women who have passed the menopause.

3. The presence of adhesions of the uterus, tubes, ovaries either to the pelvic walls or to other pelvic viscera, unless very slight.

The following suggestions are made as to the after care:

1. The patient should be kept in bed for in the lying position most of the time for a week or 10 days but may sit up some in a wheel chair and walk about some each day.

2. The lever pessary applied at the time of the operation is retained for three or four months.

3. A spring abdominal supporter is adjusted when the dressings are removed and must be worn constantly except at night until the abdominal muscles become strong enough to support the weight.

4. The bowels must be trained to move normally without straining. This should be accomplished before the operation.

5. The abdominal muscles must be developed to enable them to support the abdominal viscera in a normal way. This must be accomplished by systematic and carefully graduated exercises.

6. The constrictive and tight bands must be discarded definitely and permanently.

The patient must live the simple life, and must make the care of the health a matter of serious and constant concern. It is especially important that she should understand that the operation alone may not effect a permanent cure, but that with her thorough co-operation it makes permanent cure possible.

ADNEAL AND PERIUTERINE CONDITIONS

Rosenow, E. G., and Davis, C. H. The Bacteriology and Experimental Production of Ovaritis. *J. Am. Med. Ass.* 9:6161 75.

The authors record briefly the results of cultures made from the tissues and cystic fluid in a series of 64 ovaries removed at operation. The histories of a few illustrative cases and the results of animal experimentation made with some of the strains isolated are given.

Of 3 patients with acute tubo-ovarian abscesses, 2 showed pure cultures of streptococcus viridians in countless numbers in the involved tissues. The pus of one of these was sterile while the other showed a moderate number of the same streptococcus. The third case yielded gonococci in large numbers. In 10 cases the cultures remained permanently sterile. In the remaining 51 cases, in which the ovaries showed the usual fibrocystic degeneration, streptococci were isolated in 20, the number of the colonies ranging from one or relatively few usually in the depths of the ascorbic-dextrose agar to hundreds, and in a few instances to countless numbers. They were present in pure culture in 7 cases and

associated in the others with the Welch bacillus and a few staphylococci or colon bacilli. Welch bacilli were found in small numbers in 2 cases diptheroid-like bacilli in 10 a few colonies of staphylococcus albus in 9 the gonococcus in 2 the colon bacillus in 3 and an erobic atreptothrix in one.

The following facts support the view that the streptococci isolated from the chronic lesions when there was no history of a previous acute infection, as well as those causing acute infections of the ovary are carried to these structures by the blood more often than is generally believed.

The occurrence of fibrocystic degeneration of the ovaries in which the usual streptococcus was isolated in pure form in a young woman with an imperforate vagina.

2. The history of tonsillitis followed by symptoms of pelvic infection in a number of patients in the series.

3. The not uncommon occurrence of pelvic infection noted in gynecologic practice following angrinal attacks during the menstrual period.

4. The far more frequent occurrence of so-called idiopathic streptococcal peritonitis following angrinal attacks, in the female than the male which, according to Wilder who reviews the literature and reports a case in point is due to the occurrence of primary haematogenous ovaritis and a secondary peritonitis.

5. The absence of colon bacilli in all but three ovaries in this series, a fact contrary to expectations if local invasion occurred commonly.

6. The frequent concurrence of appendicitis, cholecystitis and arthritis in these patients, diseases proved to be due usually to streptococci from a distant focus of infection.

The occurrence of fibrous and cystic degeneration in the ovary secondary to acute infection is already well established. But as pointed out the cause of this condition without an acute infection had not previously been worked out. In this work the authors have isolated streptococci, often in pure culture, and demonstrated them in the tissues in the areas showing infiltration roughly in proportion to the amount of tissue reaction in a large proportion of the ovaries studied. Two of the strains isolated showed a marked affinity for the ovary in two species of animals—rabbit and dog—producing hemorrhage and leucocytic infiltration (precursors of sclerotic changes) in and surrounding the graafian follicles and in the ovarian tissuestroma containing interstitial cells in the fully developed corpus luteum in a pregnant rabbit.

Hence, the conclusion seems warranted that fibrocystic degeneration of the ovary even in the absence of previous acute infection is due commonly to a low grade haematogenous infection by streptococci having elective affinity for these structures. Owing to the fact however that the number of bacteria found is relatively small and that the experimental lesions in the ovary are not due to an overwhelming growth it is clear that while excretion

and resection of ovaries is indicated in some instances, it should no longer be done without due regard for the existence of chronic foci of infection which may serve not only as the place of entrance but also as the place for the bacteria to acquire the peculiar properties necessary to infect the ovary. There is little indication for the removal of this type of ovary with the idea that it may play the rôle of a secondary focus of infection yet the second case in the series indicates that at times is possible. The results suggest however that the early eradication of primary foci of infection in this type of patient might in some cases prevent the premature sclerotic degeneration of the ovary.

McGlinn J. A. The End Result of Resection of the Ovaries for Microcystic Disease. *Am J Obst & Gynec* 9:6 1913 435

From his own experience and that of other operators the author concludes that there is nothing to be gained by resecting the ovary which has undergone small cystic degeneration. He believes that resection tends to make the condition worse and either removes the more diseased ovary or simply punctures the cysts which are near the surface. The associated pathology in the pelvis must also be cleaned up. Following the operation the patients are treated to relieve pelvic congestion and if possible to prevent its future development. Five brief histories are given to show the futility of resecting the ovaries.

C. H. DAVIS

Llewellyn T. H. and Block F. B.: Hydrops Tubae Profusa. *J Am Med Ass* 9:6 1913 18

The patient was a very stout woman aged 33. She had been married for fourteen years, but had one child some years previous and no miscarriages. The menstrual periods were never regular. Every other month the flow was profuse while in the intervening month it was scanty. The previous history presented nothing of importance except that she had had her left tube removed four years before. She complained of throbbing pains in the sacral and right ovarian regions associated with a vaginal discharge. A short time before while stepping from the sidewalk to the street she felt a sharp stabbing pain in the right side and felt a sensation as though something burst. Immediately afterward a brownish discharge issued from the vagina and has continued to do so ever since.

At operation the left ovary was found to be transformed into a follicular cyst about the size of a peach the right tube was enlarged and contained fluid while the right ovary seemed to be in good condition. The operation consisted of a supra-inguinal hysterectomy, right salpingectomy, and left oophorectomy. On examination of the pathologic specimen after the operation was completed it was found that when gentle pressure was made on the tube there was a flow of clear watery fluid from the tubal ostium at the uterine

EDWARD L. COXELL

EXTERNAL GENITALIA

Salvador J.: A Case of External Genital Deformity in a Woman Due to Retardation in Morphologic Evolution. (*U. de Chile*) 1913 100

The author reports a case of external genital deformity in a woman aged 25 married four years and nullipara. Coitus has always been very painful. Examination has led her to be a well formed woman with a scrotal anal abnormality. In the first part of the urogenital tract with a part of the unruptured hymen with the normality. The vulva was that of nullipara. The vagina was short only 6 cm. There was no apparent hymen nor any hymenial sulcus. There was no external genitalia. The hymen is situated deeply within the scrotal canal and abnormally developed in the vaginal canal being behind it.

The immediate cause of the deformity was a retardation in morphologic development of the genitalia and not an interruption in the genital growth. The organ represents a fetal type with uterine aplasia. It is due to a pathologic interruption during embryonic life.

On account of this abnormal condition conjugal relation was impossible and sterility. Added to this had for the past two years been annoyed by an abundant mucopurulent leucorrhoea.

The treatment included a surgical and the author made a hymenotomy followed by a double colpoplasty with good results. However he is of the opinion that if pregnancy should result and go to term the structure of a portion of the vaginal canal would undoubtedly cause dystocia.

W. A. BRENNAN

Young E. B.: A Simple After Treatment for Perineal Wounds. *Bull Am Med Ass* 9:6 1913 65

The method at the Boston City Hospital has been used for nearly ten years and has been generally adopted for some time as the standard treatment. The aim is to maintain the greatest possible degree of cleanliness and dryness as under such conditions infection and irritation are least likely to occur.

After twenty-four hours when the bleeding has ceased the gauze perineal pad is omitted and the genitals and fissure between the buttocks kept liberally covered with a drying and antiseptic powder. For this purpose various mixtures have been used the best being the compound zinc oxide with boric acid. Results have been good with the stearate of zinc alone but rather better with the boric acid added as there is less tendency to decomposition of whatever discharge may come from the wound or elsewhere. The greatest living of

the stearate of zinc is that it sheds water and keeps the parts dry. In practice it has been found that mixtures of tereate of zinc and boric acid made by the physician are not so satisfactory as those prepared by the pharmaceutical firms.

The powder is best applied with the patient lying on the side the upper buttock being raised and the powder thrown into every fold. It is not sufficient to dust lightly or use the powder blower. The parts must be thickly covered, especially between the buttocks, and kept so throughout the healing. If the best results are to be obtained. Although the powder gradually becomes moist, it gives excellent protection to the skin, is mildly antiseptic, and sheds water to an amazing degree. With reasonable care it is usually possible to maintain a skin of dryness.

If, as occasionally happens, there is considerable tendency to moisture and maceration of the skin, the application of a 1 per cent aqueous solution of ichthol before dusting with the powder will be found effective.

The patient free from any dressing lies upon a small pad which collects any discharge from the vagina or elsewhere and can be changed whenever necessary. The genitals are carefully washed after urination and defecation and as often as may otherwise seem necessary.

The advantage claimed for this method of treatment are dryness of the parts and hence less tendency to irritation and infection. There is also no perineal dressing to increase perspiration, absorb discharges, and form a poultice.

EDWARD L. CORNELL.

MISCELLANEOUS

Barnes, F. M. J. Psychiatry and Gynecology
Surg. Gynec. & Obst. 9 6 1914, 579.

The origin of the belief in the causal relationship of genital to mental disorder, a review of the theories which have been advanced in explanation of the character of such relationship and an analysis of the data which has been presented in support of such theories are considered. Absolutely contradictory views have been held at different periods and the full gamut has been run from disavowal of complete oophorectomy in genitally normal females to no-operative treatment in females with demonstrable genital disease. Of the various theories which have been proposed the toxic and endocrine are today receiving the greatest attention.

The facts available do not warrant the assumption that diseases of the ovary or disorders of its internal secretion are in themselves responsible for the production of any psychoses. Statistics do not bear out the contention that gynecologic disease deserves the importance credited to it by some. The vast majority of mental cures reported have occurred in psychoses which were more or less acute and self-limited. Where operative indications exist, and it is now the consensus of opinion that these are

the same as the insane as the sane, the results obtained by operation have been considered apart from the possible effect of such measures as are instituted during the period of post-operative care.

Although the menstrual period is accompanied normally by a certain group of phenomena referable in part to alterations of function of the nervous system and although these are sometimes exaggerated in so-called nervous women, it has been shown that menstruation itself is the cause of a psychosis. The calm judgment of the majority both psychiatrists and gynecologists, tends at present strongly to the belief that cause of insanity is to be found in fetal genital disease or dysfunction and that gynecological treatment even where dictated by the gynecological condition, cannot be recommended as a cure for psychoses.

T. H. E. Hydridiform Mole. *La Presse Méd.*
9 6 1914, 339.

The above report of a case of hydridiform mole occurring in a primipara 2 years old. The last regular menstruation occurred July 7 and the usual early symptoms of pregnancy were noted. A light flow began in September and continued till the mole was expelled. In November the fundus was 10 to 12 breadths below the umbilicus, the cervix soft and the uterus had a decidedly boggy feel. On December 7 the mole was expelled. A fetus was found. There was no operative treatment but the patient is being kept under close observation on account of the possibility of deciduoma malignum following a case of vesicular mole. This point was emphasized in the discussion. The anomalous features of this case were that there had been no coagulative hemorrhage and no cysts had been expelled. It was further pointed out that normal pregnancy and labor can occur after the expulsion of such cysts. C. D. H. TUN.

Vignes, H. Experimental Researches on the Mechanism of Menstruation (Recherches sur le mécanisme de la menstruation). *J. d'obst.*
9 6 1914, 24.

From Vignes' experiments both *in vitro* and on living animals he finds that the ovum attracts to itself certain number of heterogeneous and auto-genous toxic substances. Certain of these substances are necessary for the development of the ovule. However the method of their production is not known.

In whatever way the phenomena of ovulation are produced, there is produced at the same time modification of the uterine mucosa which prepares it for nidation. If this is not effected menstrual hemorrhage is produced and this hemorrhage carries off at once all the reserves prepared for the early stages of development.

Menstruation is not only a cellular abortion, the abortion of an ovule, but it is a chemical abortion.

W. A. BREIDEN.

dation. He claims that it keeps the uterus well contracted and the muscular power of the fasciæ, and stimulates the breasts.

I conclude Bo did later that in private practice he has not applied forceps in two years. He gave a patient thirty small hypodermatic injections of pituitrin and delivered her safely without and without the aid of instruments. F. C. LEVINSKY

Fonyo J. Transperitoneal Suprasympphysal Cesarean Section on Account of Scariform Growth in the Vagina (Transperitonealer suprasympphysaler erhaltender Kaiserschchnitt wegen totaler narbiger Verwachsung der Vagina). *Zentralblatt f. Gynäk.* 9: 621 N. 4

The case reported occurred in a II para, 24 years old who after the first birth had suffered complete peritonitis for which she received no treatment. The vestibulum became almost entirely filled with dense hard, scarry connective tissue with resulting hamatometra. The woman however became pregnant again and the pregnancy proceeded to term. When labor was indicated the author having made several deep incisions (under narcosis) in the vagina with the episiotome stretched the vagina in order to afford means for escape of the lochia. Finally using this suprasympphysal cervical cesarean section was done and the child was delivered in good condition. The tubes were ligated. The case recovered normally. W. A. BRUNN

Adair F. L. Hemorrhage Associated with Partial and Complete Detachment of the Normally Implanted Placenta. *Am. J. Surg.* 9: 622, 54

Two clinical types are recognized, one with relatively concealed hemorrhage, the other in which the bleeding is absolutely concealed. So far as the etiology is concerned the author speaks of two groups, the mechanical and the toxic. In the former both intra and extra uterine trauma may produce the hemorrhage, in the latter any toxin which produces degenerative conditions in the maternal or fetal placenta may be responsible for the bleeding.

Certain milder forms are relatively important and cannot be diagnosed a parturient. In the more severe forms the symptoms to be kept in mind are pain, shock, and those manifestations associated with hemorrhage.

There may be diffuse distention of the uterus or this may be localized producing the so-called accessory tumor.

Mensuration may show progressively enlarging uterus.

The hemoglobin estimation may show increasingly severe anemia.

On of the main conditions to be differentiated is placenta previa. The chief differential point is the palpation of the placenta through the cervix uteri.

The objects to be accomplished by treatment are the maintenance of intra and extra uterine pressure throughout the early rapid, and complete evacuation.

It is the uterus through the parturient canal if the condition is favorable but if not cesarean section should be performed. There should be symptomatic treatment to combat the shock and anemia.

Wilson, A. M. Nitrogen Metabolism During Pregnancy. *Bull. J. Biol. Chem.* 11: 95

The nitrogen metabolism of three normal pregnancies was studied in one patient for a period of four weeks from the tenth to the fourteenth week of pregnancy. The other two patients were studied for the last 35 and 60 days of their respective pregnancies of short time in the puerperal period.

A fully liberal diet was allowed. Each article of food was weighed or measured before being given to the patient and ymorrhoidal excretion and gain weighed and measured. The patients were kept under normal conditions possible in regard to exercise.

The urine was collected for twenty-four hour periods and daily analyses made. From these daily analyses the daily average nitrogen content of the urine for periods of one week of time was estimated. Daily estimations of the ammonia nitrogen were made on all specimens and the amino-acid nitrogen was estimated for variable periods. The total nitrogen was determined by the Kjeldahl method, the ammonia by the method of Løwen, and the amino nitrogen by the Van Slyke method. The feces were preserved and analyzed weekly and from the results obtained, the daily average nitrogen content was calculated. The patient was weighed at frequent intervals.

All three patients were perfectly normal without nausea, vomiting or other gastro-intestinal disturbance.

The conclusions drawn were as follows:

1. In the perfectly normal pregnant woman at the beginning of pregnancy the nitrogen content of the body has hitherto been supposed possibly the organism may acquire the capacity for storing nitrogen from the very beginning of the pregnancy.

In the early months this storage is far in excess of the actual needs of the developing ovum, and this excess must be added to the general maternal organism.

2. Storage of nitrogen continues throughout the entire duration of pregnancy, being most marked during the last few weeks, when the fetal needs are at a maximum.

3. The nitrogen stored is greatly in excess of the actual needs of the developing ovum, so that apart from the amount needed for the hypertrophy and development of the genitalia and breasts, a large proportion of the nitrogen stored is added to the general maternal organism as reserve material, though concerning the form in which this reserve is stored it is impossible to make any positive statement. The nitrogen capital of the maternal organism

ism is thus increased though the reserve supply may possibly be entirely exhausted during the puerperium and period of lactation.

5 In the healthy woman who goes through a normal pregnancy the period of gestation does not necessarily represent a sacrifice of the individual for the sake of the species but may actually be a period of gain.

6 There is a relative increase in the percentage of urinary nitrogen excreted in the form of free amino-acids though not necessarily an absolute increase in this form of nitrogen.

7 There is also a tendency for the percentage of ammonia nitrogen to become increased during the last weeks of pregnancy although at other times during the pregnancy there is practically no variation from the percentages noted in non pregnant individuals upon a similar diet. D. H. B. YD.

Kohlmann W. Fibroids Complicating Pregnancy. S. A. M. J. 9:6 445.

In considering the treatment of fibroids complicating pregnancy Kohlmann classifies the cases as follows:

1 The first class includes probably the majority of cases which are without any clinical significance and do not interfere with either pregnancy or labor. The tumor may be discovered accidentally during an examination or post partum bleeding may lead to its discovery.

2 The second class includes cases in which the fibroid causes pronounced symptoms which may prove dangerous to the mother and fetus. In these cases enucleation of the tumor is advised.

3 The third class includes cases in which the location or size of the tumor or the associated displacement of the uterus make an expectant treatment extremely dangerous to mother and child. In some cases a delivery through the natural channel is impossible. In such cases pregnancy should be allowed to go to term but at the end of pregnancy or the beginning of labor radical treatment should be instituted. The operation of choice should be cesarean section with supravaginal (Forro's) or total hysterectomy.

4 The fourth class includes cases in which the progress of pregnancy would increase the suffering and even endanger the life of the patient while abortion would be very difficult and dangerous on account of the distorted uterine channel. Even after successful termination of one pregnancy there is danger of succeeding ones. In such cases the author advises total hysteromyomectomy of the gravid uterus or supravaginal as recommended by Landau.

L. K. COLEMAN

LABOR AND ITS COMPLICATIONS

Saltbury W.: Three Cases of Labor Obstructed by Ovarian Cyst. Proc. R. Soc. Med. 9:6 1. Ob. G. & S. 1.

A case seen late in pregnancy or early labor is most safely treated by cesarean section. Seen

late in labor—especially if the uterus be infected—the safer course is to turn the uterus out of the abdomen, remove the cyst, and deliver the child per *partu* *vivum* after closing the abdomen. The method of induction of labor late in pregnancy followed by water bathing until dilatation is complete, the delivery by forceps or craniotomy has a very favorable prognosis. The obstructive frequency of late in pregnancy rupture of the membranes, the uterine torsion, dilatation of the os, and the cystic rupture of the bladder, not having been performed. W. H. H. V.

PUERPERIUM AND ITS COMPLICATIONS

Huxley F. M. Fatal Rupture of the Bladder During the Puerperium. F. R. S. Med. (Ob. G. & S.) 4.

A primipara delivered by forceps per *partu* *vivum* at 9 P. M. on the 11th day of the pregnancy. On the 12th day the patient was attacked with severe abdominal pain, micturition, and loss of control of the bladder. The urine was free in the bladder, the bladder was not enlarged, and the patient was not in pain. The rupture of the bladder was probably due to pressure during delivery on the distended bladder. The pressure produced an avulsion of the bladder musculature so that the patient was unable to void. The abdominal contraction at the time of micturition was sufficient to produce the rupture. W. H. H. V.

Porritt N. The Treatment of Puerperal Septicæ by Uterine Suction and Drainage. B. J. O. G. & S. 10.

The uterine tube has all the advantage with none of the danger of the uterine tube. In at least two cases the author has seen the uterine tube, or a part of it, protrude into the vagina rapidly fatal general infection while in another case it set up an acute purulent chorioamnionitis.

Three cases are reported in which the uterine contents are removed. The following instruments were used:

A glass Budin catheter to which the inlet end of a Higginson's syringe was attached. The syringe was passed into the uterus. To secure the syringe to the Budin catheter the inlet valve was removed. The tube of the syringe between the bulb and the catheter was held firmly and the bulb squeezed so as to drive out the retained air through the nozzle. On releasing the pressure on the bulb, the valve behind the nozzle closed and prevented the return of the air. There was then a vacuum in the syringe and on releasing the pressure on the tube between the bulb and the Budin catheter, suction was exercised through the catheter within the uterus. No air was drawn into the uterus although the suction drew into the orifices of the catheter thick grumous semipurulent masses which were too large to pass through and with the catheter

was withdrawn, came with it. Reintroduction of the catheter and suction drew out more of these thick pieces.

Uterine suction discloses the condition in the interior of the uterus. It is most instructive to watch the gradual alteration of the matter with drawn from a thick, offensive fluid, loaded with semisolid purulent masses, to a clear red liquid and from that to an inoffensive mucus. Moreover it prevents the physician from being misled by the deceptive character of the discharge found upon the pad. The pad may be covered with discharge which may be only an overflow or may not come from the penthouse in the uterus at all, for there may be odorless discharge on the pad and a profuse fluid in the uterus. Efficient drainage of the uterus is the key to successful treatment of puerperal sepsis.

Two of the three cases reported recovered.

EDWARD L. CORNELL.

Mitchell, A. G. The Duration of the Nursing Period in Women of the United States. *J. Am. M. Ass.* 9, 6, 1911, 600.

An analysis is presented of almost 3,000 cases taken from the records of the Children's Hospital Philadelphia, during the last fifteen years. As it was the desire to determine, as far as possible, the ability of the mother to nurse her cases were excluded. It was the duration of the physiologic period of lactation, apart from disease or deliberate act of the mother which was the problem to be solved. Thus when the records showed that the mother stopped nursing from some such cause as going to work, or lactation was terminated by an acute infection or mammary abscess, the case was not included.

It may certainly be stated, however, that the statistics to be presented show with reasonable accuracy the length of breast feeding in the hospital class of Philadelphia women. These women are of different nationalities, including Italian, German, Russian, Armenian, Irish, and others. Many of them are native born Americans and a fairly large percentage consist of Jewish and colored women.

From the beginning of 1900 to the end of 1903 there were 734 cases in which the average length of lactation was 5.92 months. From the beginning of 1905 to the end of 1909 there were 87 cases with an average of 6.36 months. From the beginning of 1911 to the end of 1914 there were 58 cases with an average of 5.76 months, therefore of a total of 879 cases during the fifteen years, the average length of lactation was 6 months.

If it is borne in mind that this is a study of the statements of the poorer class of city women, the following conclusions may be justly drawn.

There has been no decline in breast feeding in the last 5 years.

The women of the poorer class compare favorably in the period of lactation with the women of the more prosperous class in this country.

3 The women of this country compare favorably to the period of lactation with European women.

4 The average period of lactation in children entered at the hospital was 6 months.

5 Twenty per cent of the women did not nurse their children. 80 per cent nursed a week or longer. 55 per cent nursed three months or longer. 42 per cent nursed six months or longer. 34 per cent nursed nine months or longer. 2 per cent nursed a year or longer. 9 per cent nursed eighteen months or longer and 6 per cent nursed 19 years.

6 For the reason that artificially fed babies are more susceptible to gastro-intestinal and nutritional disturbance the infants brought to the hospital were in the large majority of cases bottle fed at the time of their entrance there. This conclusion is inevitable that the figures given represent the minimum of lactation.

Table II was a study of the statements of 819 mothers when questioned regarding the length of time their children were breast fed.

Period of Breast Feeding in Months	1900-1904 Per Cent	1905-1909 Per Cent	1910-1914 Per Cent	1915-1919 Per Cent
Not breast fed	20	14.1	17.3	29
1 to 3	13.7	14.1	17.3	29
4 to 6	26.3	26.3	26.3	26.3
7 to 9	26.3	26.3	26.3	26.3
10 to 12	26.3	26.3	26.3	26.3
13 to 15	26.3	26.3	26.3	26.3
16 to 18	26.3	26.3	26.3	26.3
19 to 21	26.3	26.3	26.3	26.3
22 to 24	26.3	26.3	26.3	26.3
25 to 27	26.3	26.3	26.3	26.3
28 to 30	26.3	26.3	26.3	26.3
31 to 33	26.3	26.3	26.3	26.3
34 to 36	26.3	26.3	26.3	26.3
37 to 39	26.3	26.3	26.3	26.3
40 to 42	26.3	26.3	26.3	26.3
43 to 45	26.3	26.3	26.3	26.3
46 to 48	26.3	26.3	26.3	26.3
49 to 51	26.3	26.3	26.3	26.3
52 to 54	26.3	26.3	26.3	26.3
55 to 57	26.3	26.3	26.3	26.3
58 to 60	26.3	26.3	26.3	26.3
61 to 63	26.3	26.3	26.3	26.3
64 to 66	26.3	26.3	26.3	26.3
67 to 69	26.3	26.3	26.3	26.3
70 to 72	26.3	26.3	26.3	26.3
73 to 75	26.3	26.3	26.3	26.3
76 to 78	26.3	26.3	26.3	26.3
79 to 81	26.3	26.3	26.3	26.3
82 to 84	26.3	26.3	26.3	26.3
85 to 87	26.3	26.3	26.3	26.3
88 to 90	26.3	26.3	26.3	26.3
91 to 93	26.3	26.3	26.3	26.3
94 to 96	26.3	26.3	26.3	26.3
97 to 99	26.3	26.3	26.3	26.3
100 to 102	26.3	26.3	26.3	26.3
103 to 105	26.3	26.3	26.3	26.3
106 to 108	26.3	26.3	26.3	26.3
109 to 111	26.3	26.3	26.3	26.3
112 to 114	26.3	26.3	26.3	26.3
115 to 117	26.3	26.3	26.3	26.3
118 to 120	26.3	26.3	26.3	26.3
121 to 123	26.3	26.3	26.3	26.3
124 to 126	26.3	26.3	26.3	26.3
127 to 129	26.3	26.3	26.3	26.3
130 to 132	26.3	26.3	26.3	26.3
133 to 135	26.3	26.3	26.3	26.3
136 to 138	26.3	26.3	26.3	26.3
139 to 141	26.3	26.3	26.3	26.3
142 to 144	26.3	26.3	26.3	26.3
145 to 147	26.3	26.3	26.3	26.3
148 to 150	26.3	26.3	26.3	26.3
151 to 153	26.3	26.3	26.3	26.3
154 to 156	26.3	26.3	26.3	26.3
157 to 159	26.3	26.3	26.3	26.3
160 to 162	26.3	26.3	26.3	26.3
163 to 165	26.3	26.3	26.3	26.3
166 to 168	26.3	26.3	26.3	26.3
169 to 171	26.3	26.3	26.3	26.3
172 to 174	26.3	26.3	26.3	26.3
175 to 177	26.3	26.3	26.3	26.3
178 to 180	26.3	26.3	26.3	26.3
181 to 183	26.3	26.3	26.3	26.3
184 to 186	26.3	26.3	26.3	26.3
187 to 189	26.3	26.3	26.3	26.3
190 to 192	26.3	26.3	26.3	26.3
193 to 195	26.3	26.3	26.3	26.3
196 to 198	26.3	26.3	26.3	26.3
199 to 201	26.3	26.3	26.3	26.3
202 to 204	26.3	26.3	26.3	26.3
205 to 207	26.3	26.3	26.3	26.3
208 to 210	26.3	26.3	26.3	26.3
211 to 213	26.3	26.3	26.3	26.3
214 to 216	26.3	26.3	26.3	26.3
217 to 219	26.3	26.3	26.3	26.3
220 to 222	26.3	26.3	26.3	26.3
223 to 225	26.3	26.3	26.3	26.3
226 to 228	26.3	26.3	26.3	26.3
229 to 231	26.3	26.3	26.3	26.3
232 to 234	26.3	26.3	26.3	26.3
235 to 237	26.3	26.3	26.3	26.3
238 to 240	26.3	26.3	26.3	26.3
241 to 243	26.3	26.3	26.3	26.3
244 to 246	26.3	26.3	26.3	26.3
247 to 249	26.3	26.3	26.3	26.3
250 to 252	26.3	26.3	26.3	26.3
253 to 255	26.3	26.3	26.3	26.3
256 to 258	26.3	26.3	26.3	26.3
259 to 261	26.3	26.3	26.3	26.3
262 to 264	26.3	26.3	26.3	26.3
265 to 267	26.3	26.3	26.3	26.3
268 to 270	26.3	26.3	26.3	26.3
271 to 273	26.3	26.3	26.3	26.3
274 to 276	26.3	26.3	26.3	26.3
277 to 279	26.3	26.3	26.3	26.3
280 to 282	26.3	26.3	26.3	26.3
283 to 285	26.3	26.3	26.3	26.3
286 to 288	26.3	26.3	26.3	26.3
289 to 291	26.3	26.3	26.3	26.3
292 to 294	26.3	26.3	26.3	26.3
295 to 297	26.3	26.3	26.3	26.3
298 to 300	26.3	26.3	26.3	26.3

EDWARD L. CORNELL.

MISCELLANEOUS

Gentili A. Histochemical Research Regarding the Function of the Decidua (Indagini istochimiche riguardanti la funzione della decidua).

A. d. ostet. ginec. 9, 6, XVIII, 8.

As the results of his researches on human and animal decidua Gentili finds that the decidual cells possess an essential function in the elaboration of lipid substances belonging to the group of phospholipids.

The lipoid function is in clear and precise correlation with the cellular vitality. If these elements are defective either there is lack of lipid production or it passes into true fatty degeneration. The disposition of lipoids among the protoplasm and the presence of granules of this substance in the intercellular spaces indicate the method of elimination followed by the lipoids.

W. A. BRENNAN

Ireato D: Analgesics in Parturition Clinical and Experimental Contribution (Los analgesicos en el parto contribucion clinica y experimental) Rev Med Argent 9 6 xu 93

The author has carried out extensive clinical investigations on parturient women supplemented by animal experiments in an endeavor to determine the action of morphia, pantopon, hydrate of chloral, etc., on the physiological progress of parturition.

Hysterographic methods were formerly employed but the older apparatus in which the uterine movements were transmitted from within the uterus have been discarded in favor of external hysterography, the movements being transmitted from the abdominal wall in the region of the uterine fundus and beyond the influence of respiratory action. The transmitted movements are registered on a revolving drum.

The results as summed up by the author are as follows:

1 The toxic dose of morphia for guinea pigs may be taken as 0.005 gr per gram weight of the animal.

2 Hypophysary solutions do not disintoxicate morphia.

3 Maltose ferments not only do not disintoxicate morphia but appear to increase its toxic power in animals.

4 The physiologic action of analgesics and parto-analgesics upon the arterial pressure and the uterus is equal to that of morphia.

5 The union of large doses of morphia to small doses of hypophysary extract annuls the oxytocic action.

6 Solutions of malt ferments have an oxytocic action although more ephemeral than those of the hypophysis.

The general opinion that pain and efforts are factors which are opposed to morphia intoxication is without foundation. The properties of morphia injected during pregnancy may be transferred without modification on to the fetal circulation. Sensibility to the toxic action of morphia is greater in the infant. Personal susceptibility toward morphia varies greatly with the subject. In 40 per cent of the cases there was not sufficient sedation of the labor pains to justify the use of large doses of morphia.

7 Products with a morphia base destined to produce analgesia are constant in their action and inject a few such substances during the expulsion period have little effect; moreover their administration in cases of obstetrical intervention is not only useless but prejudicial.

8 Derratives of opium like all analgesics do not lessen the pains of labor but alter the uterine rhythm because they diminish the number and intensity of the contractions. Compositions with a morphia base may intoxicate without lessening labor pains.

10 Generally the dilatation and expulsion periods are prolonged in analgesic parturition. The duration of labor may be 48 hours in multiparae and 24 hours in primiparae. Artificial rupture of the membranes must be resorted to more frequently in analgesic women likewise with obstetrical intervention.

11 Opium derivatives used in analgesic parturition vary in degree of effect on the tissues and muscles of the larynx. Chloroform is the best. It is the method of inducing an anesthetic analgesia in parturition and should be used in preference to all others.

Regnault J: Choice of an Anesthetic and General Anesthetic in Surgery and in Obstetrics. J

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Regnault discusses the use of chloroform, chloroform for which he finds that analgesia appears before complete loss of consciousness, nitrous oxide in the half-conscious state, more or less, the diminution of the larger the larynx, all an open rapid anesthesia almost always without a considerable diminution of the quantity of chloroform necessary to maintain anesthesia, rapid awakening and habitual absence of vomiting.

Walker J: The Technique at the Jewish Maternity Hospital and Its Results. J Med N Y

9 1 xu 4

The author outlines the general management of patients at the Jewish Maternity Hospital and states that they have found the following rules necessary to good result:

1 All deliveries shall be conducted on the same basis as a surgical operation, sterile draping of the patient and proper preparation, proper cleansing of the operator's hands and the use of a steril gown and gloves.

2 Making the smallest number of vaginal examinations, limiting oneself to one or two and depending a good deal on external palpation for general information and the use of rectal examination for definite information.

3 By allowing the patient to have the proper rest of labor and eliminating meddling obstetricals.

4 The careful watching of the fetal heart sounds and uterine contraction by an intelligent nurse thus saving children which otherwise would be stillborn.

5 The more restricted use of pituitrin to cases in which full induction is not.

6 All cases showing a temperature above 99.3 should be regarded as suspicious and be isolated until proved otherwise.

GENITO-URINARY SURGERY

ADRENAL, KIDNEY AND URETER

Shannon, W. R. Experimental Cloudy Swelling of the Kidney in the Rabbit. *J. Lab. & Clin. Med.* 9, 6, 1, 54

Shannon defines Virchow's cloudy swelling (*trübe Schwellung* 1838) of the kidney and quotes the opinion of others regarding albuminous granules and darkened tubuli.

Claiming that turbidity and swelling of an organ are not always associated with increase of albuminous granules, yet on the other hand, there may be a marked increase of albuminous granules in the cells without the presence of turbidity or swelling, an experimental study on rabbits was undertaken.

1. In the first experiment compensatory circulatory increase was produced by unilateral nephrectomy or ureteral ligation with removal of the other kidney in forty-eight hours.

In the second experiment chemical irritants (tartrates) were injected subcutaneously and the kidneys were removed twenty-eight hours thereafter.

In the third experiment, autolyzed liver solution was injected intraperitoneally. In eighteen hours one kidney was removed, the other was removed after the death of the animal.

In the fourth experiment infection was produced by injecting cultures from *Pasteurella shoenleae*. The kidneys were removed from the rabbits during the different stages of infection, thus getting the different degrees of the cloudy swelling.

The summary of the findings are as follows:

1. The normal rabbit kidney always contains, in the convoluted tubules, coarse albuminous granules. Usually these granules are so numerous in few tubules that they appear dark in the fresh tissue. The granules are apparently thin-walled vesicles filled with fluid. They are best fixed by solutions containing formalin. They are not fixed in solutions containing acetic acid.

2. When one kidney is removed the dark tubules are increased in the opposite kidney during the first twenty-four or forty-eight hours, but the increase of albuminous granules is not sufficient to cause any definite change in the gross appearance of the kidney.

3. Subcutaneous injections of tartrates produce swollen, cloudy kidney but there is no increase of albuminous granules. The cloudiness and swelling are apparently due to edema, anemia, tissue disintegration, etc.

4. Intraperitoneal injections of autolyzed liver tissue produce a markedly cloudy and swollen kidney. The albuminous granules disappear en-

tirely. The gross changes are apparently due to the same factors concerned in the tartrate experiments.

5. Chronic suppurative processes attended with marked emaciation cause an enormous increase of albuminous granules in the kidneys. These granules are often larger than the normal and irregular in shape but they seem to have the same chemical composition.

6. Acute toxemia causes rapid disappearance of normal albuminous granules.

7. A subacute toxemia superimposed upon a chronic suppurative process causes disappearance of the albuminous granules.

8. Kidneys which show an enormous increase of albuminous granules usually give normal phythalein output and the cells are usually intact. This form of cloudy swelling is therefore probably not degenerative change but a physiological response to an increase of proteid waste product in the blood.

9. There is relation between the formation of albuminous granules and fatty metamorphosis.

It is suggested that the term cloudy swelling be discarded and that the several processes producing this appearance be considered separately.

C. E. BARNETT

Newman, D. Pyuria, Symptoms; Its Causes and Diagnosis. *Glasgow M. J.* 9, 6, 1907, 6

Pyuria is a symptom of many different lesions. Pus may emanate from any point of the urinary tract from the kidney to the urethral meatus. In every case of pyuria the important factors to determine are the nature of the infection, the location of the lesion, and the extent of harm which has resulted from the invasion.

To discover the presence of pus in the urine is important but to trace the cause and recognize the particular lesion producing the pyuria is necessary before any intelligent and effective treatment can be undertaken. Pyuria is nearly always due to bacterial infection. In some cases the organisms are abundant and easily found and cultivated, in others, e.g. tuberculosis and gonococcal infection they may be hard to find and difficult or impossible to cultivate. All so-called sterile pyurias are indicative of quiescent tuberculosis.

The reaction has been considered a guide to the place from which pus comes, acidity pointing to renal and alkalinity to vesical origin. There is no foundation for this widespread belief. The reaction in these cases depends upon the organisms present. The organisms associated with acid pyuria are bacillus coli, tubercle bacillus, streptococcus

pyogenes pneumococcus bacillus typhosus and pyogenic cocci. The organisms which decompose urea and which therefore are found in alkaline urine are staphylococcus pyogenes aureus and albus gonococcus and bacillus proteus. In general it may be said that of all infections of the urinary tract in one third of the cases the reaction is alkaline and in two-thirds acid.

Following a brief discussion of the subject the author states that as a result of experimental inquiry the following assertions may be made:

1. Simple retention of the urine does not give rise to septic inflammation.

2. Small cultures of pyogenic micro-organisms such as staphylococcus pyogenes aureus staphylococcus pyogenes albus tubercle bacillus or bacillus coli communis when introduced into a healthy bladder fail to produce sepsis.

3. If the mucous membrane of the bladder be injured or diseased prior to the introduction of micro-organisms sepsis immediately occurs.

4. If the artificial retention of the urine is induced from six to twenty hours after the introduction of a septic organism into the bladder suppurative inflammation of the mucous membrane follows.

The avenues of invasion are by the blood, the lymphatics along the lumina of the excretor ducts and by continuity and through wounds.

The septic renal diseases are classified as follows:

1. Purulent embolic nephritis a descending septic and suppurative lesion of the kidney without pre-existing disease of the conducting and collecting portions of the urinary tract the septic virus being conveyed to the kidney by the blood.

2. Turulent interstitial nephritis an ascending interstitial nephritis infection being by the lymphatics from a primary septic focus in the lower urinary passages.

3. Acute septic nephritis without suppuration an ascending septic lesion of the kidney without suppuration the virus being carried to the kidney (most commonly to theortex) by the lymphatics.

4. Pyelonephritis suppurative nephritis with the antecedent septic diseases of the pelvis the secondary foci in the parenchyma of the kidney being always due to direct contamination through the uniferous tubules and lymphatics.

5. Pyelitis suppurative disease of the mucous membrane of the pelvis without distention of the cavity.

6. Hyonephrosis accumulation of pus or of purulent urine in the pelvis of the kidney the accumulation being a result of mechanical obstruction with atrophy of the renal tissue but with uterine secondary infective foci or independent accumulations of pus in the parenchyma of the organ.

In inflammation of the bladder the two most frequent sources of infection are the intestines and the urethra. Three modes of infection are enumerated.

Ascending infection by way of the urethra which for obvious reasons is more common in

women than in men is the simplest in general and colon bacillus infection.

2. Descending infection is the most common in men in which the organisms are introduced from a primary focus in the intestine by the blood and are excreted through the kidney. The highest number of cases is in typhoid fever and in malaria.

In addition to determining the presence of the urine the clinical manifestations of the urinary tract are of great importance. The following is a list of the most common symptoms.

In the majority of cases the first manifestation is the presence of pus in the urine. This is usually accompanied by a change in the color of the urine and by a change in the odor.

In all of the preceding cases the inflammation is in the form of a suppurative process. The symptoms are those of a suppurative process. The first symptom is the presence of pus in the urine. This is usually accompanied by a change in the color of the urine and by a change in the odor.

In case of marked pyuria the urine is turbid and contains many pus cells. The urine is usually accompanied by a change in the color of the urine and by a change in the odor.

The author states that in the case of the interstitial nephritis the urine is usually accompanied by a change in the color of the urine and by a change in the odor. The urine is usually accompanied by a change in the color of the urine and by a change in the odor.

1. Albuminuria entirely due to pus in the urine.
2. Interstitial nephritis from the kidney from the lower urinary tract.
3. Interstitial nephritis from the kidney due to Bright's disease or to a calculous cause.

Webster J. C. Some Observations on Pyelitis in Pregnancy. *Urologic Review*, 1904, 4.

The author does not believe that pregnant women are more prone to pyelitis than those who have never been pregnant.

The following is a list of the most common symptoms of pyelitis in pregnancy.

1. The disease usually begins between the fifth and eighth months of gestation.

2. The colon bacillus is the most frequent cause. The following are the most common symptoms.

3. In a majority of cases the disease occurs on the right side though it may be bilateral or limited to the left side.

Various speculations are advanced regarding the special influences exerted by pregnancy in causing pyelitis. Although it is possible for the pregnant uterus to so mould itself as to exert direct pressure on the ureters, we have absolutely no exact knowledge as to the frequency or the degree of obstruction to the flow of urine in the ureters.

Dilatation of the ureters and renal pelvis may be found in pregnant women at autopsy or operation but this condition may have existed prior to pregnancy. Interference with the ureters such as is produced by pelvic tumors is comparatively rarely associated with pyelitis. Moreover in a very considerable percentage of cases of hydro-ureter pyelitis is found. In those cases in which there is the greatest intra-abdominal pressure e.g. primiparity, hydramnion, twin pregnancy, tumors and pregnancy there is no greater tendency to pyelitis than in other gestation cases.

As to the greater frequency of right-sided pyelitis without ureteral catheterization no one is competent to judge whether one or both sides are affected as pain on one side only is no proof that the other side may not be affected. Nor does the pressure of the iliac vessels explain it. Dextroversion or dextrotorsion hardly explain it either for unless there is a very lax abdominal wall no appreciable movement of the pregnant uterus in advanced pregnancy can take place, and then it tends to fall forward when the woman is erect.

The greater mobility of the right kidney in non-pregnant women which leads to dilatation of the renal pelvis may cause the development of pyelitis by micro-organisms. Colon bacilli are the most common organisms found in pyelitis. As to the mode of entrance of the organism the following views are held:

From the vulva through the urethra, bladder and ureter probably rare.

Lymphatic extension from infected bladder. This is difficult to prove and must be rare.

3. The most common source is undoubtedly the large intestine, either by direct lymphatic extension or by the blood stream.

4. Distant focal infections especially those due to streptococci and staphylococci may cause pyelitis by blood transmission though definite proof has not been established.

The symptoms and signs of the disease are the same as in non-pregnant women. In some cases the patient may complain only of malaise and slight fever without pain. The fever may be high and may be accompanied by chills. There is often aching in the loins. Frequently attention is first called to a pain in the affected side accompanied by fever, nausea, vomiting. In some cases there is frequency of urination. Rarely is there actual bladder distress except where the viscous is involved. Right sided pyelitis may simulate appendicitis or

even gall-bladder disease, and serious mistakes in diagnosis may be avoided if this is borne in mind.

As to treatment Rest, bed, soft non-irritating diet, free fluids and urinary antiseptics are most widely employed and will suffice for a large percentage of cases. Autogenous culture has been disappointing. Irrigation of the kidney pelvis through the cystoscope has also been unsatisfactory.

C. C. O'CROWLEY

Smith E. O. Diagnosis and Treatment of Renal Tuberculosis. *Brit. Med. J.* 1906, 3, 7

The cystoscope has demonstrated that urinary tuberculosis is usually a primary kidney lesion. It is found in 4 per cent of the topicals, and about 20 per cent of all autopsies made on subjects that die from tuberculosis in other organs. The military form is usually found in children and young adults, while the caseous chronic varieties are more common in later life.

The route of entry is by the arterial blood stream. Infection by way of the ureter where the bacilli would have to travel against the stream and by way of the lymphatics—there are several lymph-vessels to the kidney—is generally discarded. A normal kidney will excrete tubercle bacilli but in the presence of a pathological condition of either kidney or ureter tuberculosis focus may originate with serious result.

Some writers believe that the glomerulus is the site of onset while Widdows and Weylin found the papillae the most common point. Several of the author's cases showed destruction in the pyramidal areas having apparently advanced from the papillae and calyces. Only a small area may be involved the remainder functioning but the entire organ may be broken down, forming a pocket of pus and necrotic tissue. There is usually mixed infection.

The symptoms are indefinite and cover a long period of time. Bladder symptoms are first. Frequency and pain during urination increase in direct proportion to the length of time involved. Pain in the lumbar region, unless the ureter is partially or completely blocked the palpation of a mass, pyuria, hæmaturia, and the presence of tubercle bacilli easily found indicate an advanced condition. The onset as insidious. Intermittent hæmaturia and acid urine on taking pus should be closely investigated. Guinea-pig inoculation is valuable but it takes time. Diagnosis is made by finding tubercle bacilli in the catheterized kidney urine. Repeated examinations are usually necessary. The various general tests are not of much value in localizing focus.

When one kidney is involved complete removal is indicated. The ureter should be thoroughly cauterized to prevent infection of the surrounding tissue. The instillation of 1 per cent iodoform in liquid alcohol or venereal irrigations of bichloride 1:3000 to 1:5000 will in time relieve the bladder inflammation and symptoms.

1. In conclusion the following point are emphasized
2. Frequent persistent micturition is often the earliest symptom of renal tuberculosis
3. Intermittent renal hemorrhage is frequently of tuberculous origin
4. Acid urine containing pus cells which do not culture out bacterial colonies is usually due to renal tuberculosis
5. Many cases require repeated examinations for tubercle bacilli even before stating a tuberculous reaction to establish a diagnosis

The earlier nephrectomy is done the better it is for the patient (C. D. PRAPPELL)

Macht D. I. The Pharmacology of the Ureter. Action of Drugs Affecting the Sacral Autonomics. *J. Pharm. & Exp. Med.* 1910, 19

Macht has added materially to our knowledge as to the action of certain drugs on the ureter. As a result of his original investigations he reaches the following conclusions:

1. Pilocarpine physostigmine muscarine pseud muscarine and choline in suitable doses all stimulate the rate and force of the ureteral contractions and increase the tonus of the excised ureter. Large doses of pilocarpine may however secondarily paralyze that organ
2. The pressor action of pilocarpine physostigmine and muscarine is not inhibited by previous exhibition of ergotamine
3. Atropine in sufficient rather large doses inhibit the contractions and decreases the tonus of the ureter. Small doses of atropine may produce though not invariably a primary stimulation of the ureteral contractions
4. The same effect as in the ureteral preparations described by the author were noted in rabbits by observing the ureters *in situ* after administration of pilocarpine physostigmine and atropine
5. The behavior of the ureter toward the drug studied gives pharmacological proof of its innervation by the autonomic nervous system of practical interest (H. W. L. WILSON)

Simon A. R. and Vertz, H. O. The Supernumerary Ureter. Report of a Case of Complete Unilateral Duplication. *J. Am. M. A.* 1910, 55

The authors report a case of supernumerary ureter on the right side. The three ureters all opened in the bladder without any anastomoses between them. The extra large right opening often gives the appearance of being a division of the ureter. The trigone of the bladder showed that the right kidney had its separate pelvis and excretory system revealed that it related posteriorly to the ureter on that side. The two opened just below the internal bladder.

Complete bilateral duplication of the ureter is rare but supernumerary ureter is not infrequently met. The most common anatomical

double pelvis and ureter with the ureters uniting below the bladder.

The supernumerary ureter is governed by the local nerves. It has opening in the bladder. It is not infrequently associated with a large renal pelvis and has a pyramidal shape. It is often found in the lower part of the bladder. It is not infrequently associated with a large renal pelvis and has a pyramidal shape. It is often found in the lower part of the bladder.

A supernumerary ureter is not infrequently associated with a large renal pelvis and has a pyramidal shape. It is often found in the lower part of the bladder. It is not infrequently associated with a large renal pelvis and has a pyramidal shape. It is often found in the lower part of the bladder.

BLADDER, URETHRA AND PEVUS

Walther H. W. E. Chronic Trigonitis. *Med. P.* 1910, 1

In the case of a patient with chronic trigonitis, the author reports a case of chronic trigonitis. The patient had a long history of urinary symptoms. The author reports a case of chronic trigonitis. The patient had a long history of urinary symptoms.

By repeated irrigation with alkaline solutions, the author reports a case of chronic trigonitis. The patient had a long history of urinary symptoms. The author reports a case of chronic trigonitis. The patient had a long history of urinary symptoms.

SURGERY OF THE EYE AND EAR

EYE

Argonzaraz, R. Contribution to the Study of Intra-ocular Cancer—Sarcoma of the Choroid (Contribucion al estudio del cancer intra-ocular sarcoma coroidal) *Rev. Asoc. med. Argent.* 9 6 xii 75

In the ophthalmological service of the National Hospital of the Argentine Republic, out of 84,000 patients, 3 cases ofveal sarcoma were found, a percentage of 0.3 per cent. The statistical table given by Powell gives for the various large ophthalmological clinics of the world the percentages for choroid sarcoma varying from 0.03 to 0.1 per cent. It occurs as a general rule more frequently in men than in women and in the ages between 45 and 65.

Of the 3 cases referred to by the author, 2 were in the ciliary body and 1 in the choroid. In 5 cases exact location was not possible on account of the condition. The statistics of Sattler, from Leipzig, shows 82 per cent as choroid tumors and 8 per cent as ciliary body tumors.

With regard to the treatment it is essentially surgical, either extirpation of the tumor with preservation of the ocular globe or enucleation or exenteration.

Extirpation with preservation of the globe is usually accomplished by indirect myotomy. The procedure is usually unsatisfactory as most of the interventions recur. Enucleation is the method of election in all cases of neoplasms of the uveal tract to place the patient beyond the chance of recurrence, and intervention should be as early as possible.

When neoplastic nodules show the superficiality of the ocular globe, enucleation ought not to be considered as absolutely indicated and in such cases it will be prudent to proceed with extirpation of the orbit. Metastases of the internal organs contraindicate any operative intervention.

W. A. BREWER

Jacobs and Duclos. Ocular Tuberculosis Secondary to an Industrial Accident; Clinical and Anatomical Study (Tuberculose oculaire secondaire un accident de travail; étude clinique et anatomique) *Cl. Méd. Par.* 9 6, 37

This case reported occurred in a boy of 5 who in November 1905 was struck in the right eye by a piece of iron. The resulting ulcer was treated with iodine and the boy recovered but a pronounced perkeratic injection and an intense photophobia persisted. By December whitish spots appeared in the cornea, the cornea was transparent, except where these spots occurred lat on yellowish

granulations covered the whole surface of the iris. The eye became hypotonous without any evidences of pain.

The clinical evidence, aspect of the lesions, and complete absence of pain suggested tuberculosis and the subsequent histological examination confirmed it. The authors think that there are two theories to account for the pathogenesis. Direct inoculation through the wound or localization of the organ of tuberculosis already existing in the organism. It is very difficult to choose between the two theories.

The eye was enucleated. Histological examinations were made from different sections and these are given in detail. The authors found from these examinations that small tubercle follicles existed in the cornea that there was passage of granulation tissue into the ciliary body and the base of the retina that following the general rule lesions of tuberculosis and ocularis remained in the territory of the posterior ciliary circuit that the structure had the same aspect described by other authors, i.e. in the transition from there were epithelial tubercle lymphocytes and ureol in the posterior parts was diffuse granulation composition (parenchymatous tubercles). W. A. BREWER

Huguenin, M. Traumatic Rupture of the Ciliary Arteries (Rupture traumatique des artères ciliaries) *Cl. Méd. Par.* 9 6, 8

Siegrist. Vogt described the first case of traumatic rupture of the ciliary arteries and the fundus lateration habits were necrotic. These cases are very rare. Besides Siegrist, 4 published cases the author has found only 5 more in the literature. He adds more of his own personal cases and notes from Siegrist, practice a summary is given of these cases also bibliography. The treatment is directed generally in these cases either subconjunctival injections or cauterization of the sclerotic does not usually effect very great improvement in the double with vasoconstrictors.

W. A. BREWER

Fernandez, J. Digital Compression of the Lacrymal Sac in Dacryocystitis of the Newborn. Especially La compression digital del saco lagrimal en la dacriocistitis del recién nacido especialmente) *Rev. d. med.* 9 6, 4

The author details on the value of massage of the sac in congenital dacryocystitis, applied continuously and by digital pressure, this being the simplest method of procedure.

Fully satisfactory results were obtained in the newborn as in the adult. The compression

of the lacrimal sac requires manual lexterity especially in cases of inflammations or redness in the proximity of the sac. In mono-ocular affections it is best to search for the rest of the lacrimal bone and press upon it immediately whereupon the lacrimal sac will move from that place in the fossa.

To determine the permeability of the nasal canal the author instills a drop of fluor-scin solution. He believes in Berard's teaching that by compression of the sac and antiseptic injections in those lacrimal parts previously dilated one can properly treat and cure a case of dacryocystitis. As to catheterization of the nasal canal the author considers it improper treatment; he quotes Hippel's statement that the sounding of the nasal canal is not easy or offensive and the inexperienced will make false moves which will give rise to new cicatrices.

The author describes the case of a babe 55 days old, in whom he noticed on the fifteenth day of life a dacryocystitis and an encephaloid tumor both of which responded equally well to compression practiced continually for several months when the two conditions disappeared entirely.

He considers it unnecessary to recall that in the diagnosis of a dacryocystitis in general the first thing to do is to ascertain whether the nasal canal is more or less free so that when the dacryocystitis is relieved the tears will flow their normal course.

Another case is described of a woman suffering for two years with a subacute dacryocystitis in which compression and lavage of the sac brought about a complete cure. A year after however the patient having discontinued washing the sac from time to time had another inflammation of the sac. Besides the employment of compression the inferior lacrimal point was dilated to facilitate the egress of all accumulations in the sac.

The author considers digital compression very valuable as the initial treatment in general dacryocystitis. When the condition is so acute and painful as to prohibit its use he advises applications of ice and abstention from making any incisions to avoid cicatrices upon the skin of the eyelids.

R. O. L. VI. 18.

Posey W. C. Tenotomy of the Inferior Oblique Muscle. *1896 Opht. 6: 13*

Duane is quoted as giving as indications for the operation any deviation due either to actual over-

action (spasm) of the inferior oblique muscle whether primary or secondary relaxation in which with no actual involvement of the inferior oblique the diplopia and symptoms are such as would be produced by spasm of that muscle.

The condition usually simulating spasm of the inferior oblique is paralysis of the superior rectus and the conditions are given causing true spasm or overaction of the inferior oblique: (1) paralysis of other muscles (2) paralysis of the superior rectus which along with the same cause secondary spasm of the inferior oblique of the fellow eye (3) paralysis of the superior rectus or some other depressor muscle with secondary spasm of the inferior oblique (4) the same as (3) paralysis of the abducens with compensatory innervation of the inferior oblique with spasm.

Primary spasm of the inferior oblique is rare.

The author has operated upon a child with the following results: (1) effect in all.

The patient is now able to read and is just upon the parallel of the level of the normal rim of the orbit through the muscle and is located with the trismus which is now forward and level with the cornea.

It is recommended in children who have squinted from birth that operation be postponed until long after the period of ten years at which time the child is more amenable to the operation and the muscular deviation negligible and operation is avoided.

S. S. H. W.

EAR

Good R. H. Acute Otitis Media. *III 11 J 96 133*

A brief review is given of the etiology, symptoms, differential diagnosis and treatment prophylactic local and general of acute otitis media with the object of urging the general practitioner to make an early diagnosis and avoid unfortunate complications.

The author insists upon the necessity of early diagnosis before the drum membrane ruptures and serious pathological changes have taken place in the tympanum. He advises early incision of the drum membrane by an otologist under aseptic conditions and early operation in cases where mastoid symptoms supervene together with proper general medical treatment. *1895 J. P. Peters*

SURGERY OF THE NOSE, THROAT, AND MOUTH

NOSE

Lansier L. H. Importance of Treatment of Diseases of the Accessory Sinuses of the Nose. *J. A. M. A.* 1911, Sec. 9, 6, vol. 278

In catarrhus and ethmoiditis, the thor has had favorable results with the following medication. The nasal cavities are first irrigated freely with mild alkaline antiseptic solution. The inflamed and swollen membranes are treated with a 4 per cent cocaine solution applied by means of a cotton wound probe. This is followed after five minutes by the application of a 1 per cent dilute pyril solution prolonging local anæmia produced by the cocaine. Benzoin vapor is then applied. Bishop's coryza ointment and an acetanilide compound are prescribed to be taken alternately as indicated. An ointment of bismuth and dresalin is also given, to be applied to the nasal cavities three times daily.

Where the above is not sufficient, intranasal operation consisting of removal of the anterior end of the middle turbinate and curveting the ethmoidal labyrinth is employed. After the operation is completed, the cavity is packed with half inch strip of terrilled gauze saturated with sterilized benzoated vaseline. After twenty-four hours the packing is removed and the cavity gently irrigated with a warm saline colored solution of potassium permanganate. It is then loosely packed with half inch strip of gauze saturated with a 1 per cent aqueous solution of ichthyol. After twenty minutes this is removed. This treatment is given once or twice daily for the first three days after which mild alkaline antiseptic solution is used by the patient once or three times daily. Benzoin vapor is to be used after each irrigation. In frontal sinusitis the middle turbinate may be either inflected or resected after which sound is passed followed by irrigation.

If more operative work is indicated the unilateral process is resected and the tensor ethmoidalis curvated. If this fails the total operation is indicated, the indications of which are thus tabulated:

1. When other forms of operation have failed.
2. The appearance of fistula, abscess, necrosis.
3. When symptoms of intracranial complications appear.
4. When during the course of chronic frontal sinusitis pain and fever suddenly appear and the discharge becomes fetid.
5. When the headache referred to the eye is not influenced by intranasal procedures.

6. When the discharge remains fetid despite frequent irrigation.

7. When the sinus inflammation gives rise to recurrent polypoid hypertrophies and polyp formation.

8. When simple purulent discharge is not relieved by nasal measures and the patient is anxious to procure permanent relief from his annoying symptom.

Otto M. Rott

Quintan, F. J. Significance of Hemorrhage in Operations on the Nose and Throat. *Med. Rev.* 1907

In discussing the etiological factors of hemorrhages it operates upon the nose and throat the author divides them into local and constitutional.

The chief local factors mentioned in the order of importance are:

Incomplete removal of tissue due to faulty technique.

Local lesions of blood vessels particularly where the vessels are abnormally placed or when adjacent tissues are injured.

3. Local tissue anomalies such as inflammatory processes or areas of congestion. Anesthetics contribute to the condition. General anesthetics at the time of operation and local anesthetics secondary to the operation.

The constitutional causes are hemophilia, purpura, hemorrhagic leucæmia, mæmia, and exophthalmic goiter.

The local measures mentioned for the control of post-operative nasal hemorrhage are:

Pinching the alæ close together and bending the head forward to direct the clot in position until organized.

Local injections of 20 to 30 cc. of warm liquid gelatin.

4. Yankauer method of stitching the posterior tip of the turbinate.

4. Anterior packing.

5. Post-nasal tamponade with anterior packing.

Local measures for the control of post-operative tonsillar hemorrhage are:

1. Absolute rest of mouth, throat and body.

2. Digital compression by means of gauze wrapped around the finger and dipped in peroxide or antipyrine.

3. Tonsil hæmostat.

4. Bringing the tonsil pillars together by means of large metal clamps after a gauze tampon has been inserted into the fossa.

5. Suturing the pillars.

6. Constriction of the bleeding stump.

7. Ligation of the common carotid.

Other procedures are the application of precipitated blood sera in the form of serum powder whether the bleeding be from the turbinates or the tonsil fossae. Coagulin is also used.

The constitutional homeostatic measures are

1. Injection of serum 20 to 40 cc. If bleeding continues the dose — 10 to 30 cc. subcutaneous or 10 to 1 cc. intravenously — may be repeated at intervals of 2 to 6 hour or longer.

2. Injection of pituitrin 1 ccm

3	Calcium lactate internally	Opt	M	P	rr
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THROAT

Lack, H. L. Partial Excision of the Thyroid Cartilage as an Alternative to Thyrotomy in Malignant Disease of the Vocal Cord. *J. Soc. Med.* 11, 1, 1918, 5.

The larynx and trachea were exposed through the usual median incision and a Hahn annular incision. The right ala of the thyroid cartilage was split and the perichondrium detached from its surface. The thyroid cartilage was divided in the middle line as in thyrotoxy and then the hyoid apparatus was turned at right angles so as to split the trachea horizontally about its center. The upper and lower larynx were carefully divided in the median line in front and then the incision was carried back through the ventricle of the larynx. The aperture being held open with retractors gave a good view of the grith and it was extended through the tracheal membrane and the muco-membrane of the larynx and below the grith. The quicquid of the lip consisting of the lower half of the right larynx and the trachea with the vocal cord attached in front was removed. This gave a much better view than is presented by the thyrotomy and all the greater facilities for removing the posterior portion of the cartilage and for arranging the tubecompleting the

The advantages mentioned are: (1) Better hearing and clearer speech and more thorough operation. (2) The removal of the underlying rind certainly aids in thoroughness. (3) The central bleeding means less trouble with anesthesia and less danger of blood entering the lungs. (4) Spinal packing for the wound is unnecessary. It is much easier to introduce and retract the incision. It eliminates the necessity of flapping the thyroidal membrane and the resultant pull apart of the two halves of the thyroid which then lead to much subsequent difficulty and difficulty in closing.

MOUTH

Lisen F J and Ivy R H Roentgenologic Examination in Elimination of the Mouth as a Source of Infection in Systemic Disease. *Am J Roentol* 1941; 45: 249

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Darling B. C. Oral Sepsis as a Focus of Infection
1911

THE UNITED STATES OF AMERICA
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF STAFF
WASHINGTON, D. C.

[illegible]

Indikator yang digunakan untuk mengukur tingkat keefektifan dari masing-masing indikator tersebut adalah sebagai berikut:

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cedures to correct the given condition
A. HART, C.

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Neck

- H. groups of the neck H. F. GRAHAM. Long Island M. J. 9 6 x.
- Cleithral keel of the anterior region of neck J. de D. V. RIZZ. Gac. méd. d. Caracas, 9 6 xiii, 65.
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SURGERY OF THE CHEST

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SURGERY OF THE EYE AND EAR

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Pathology	Glaucoma	m	C W M K	I D
Notes	J. Ophth.	Otol.	& I m	I
368				
Theories of gl.	ma			W I R W L D
J. Ophth.	Otol.	& Laryngeal		
The evolution	of the	mit		t m
W. REBER	J. Ophth.	Otol.	& I	
37				
Results obtained	in the	F. R. T. S.		I I
operated	n of gls	ma	I W I N	I Ophth. C T I
& Laryngeal				
Delirium	illness	xx		I a W C
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C. Clodial	I (D)	DE		I Ophth. C T I &
Laryngeal	016	xx		
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 Bilateral dex t t in phid t hild C I tter
 Proc h Soc Med Lave d Soc
 Accident and t t mes t th e the f ment
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Miscellaneous

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 k I H t r t H n t M f
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 C h i t f n e s t h b a l l J O M R e v t r e
 F a t t M d
 F r a m a r u p t t t h e d u a r y r t n e s M H e t
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 Th r e e t t h t n t m n t o p e r a t i o n
 t H u s A h O p h t h o c d
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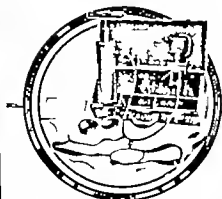
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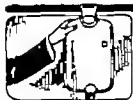


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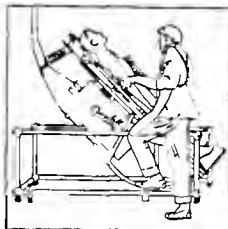
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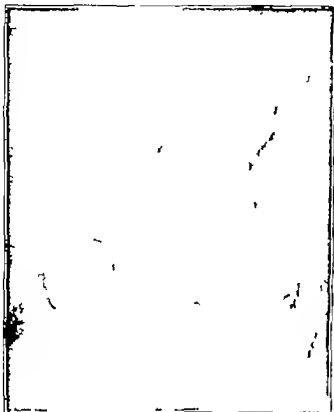
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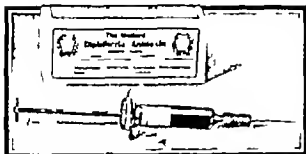
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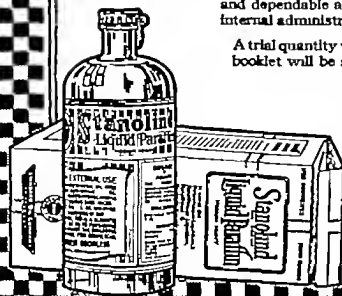
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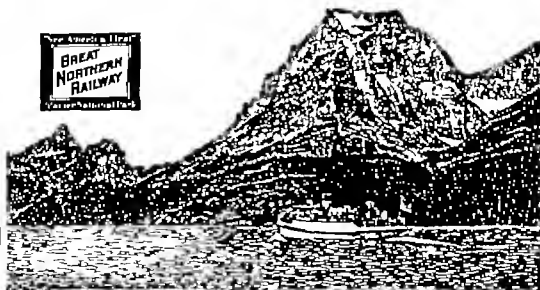
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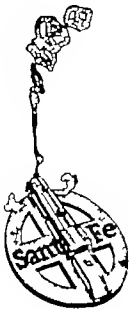
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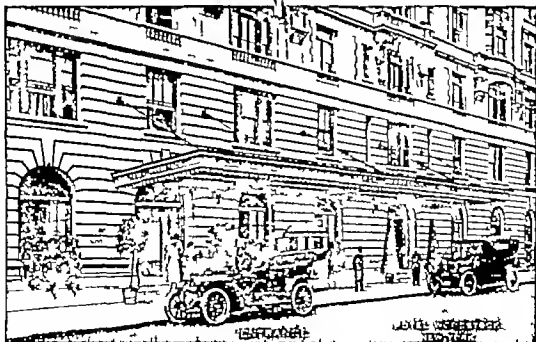
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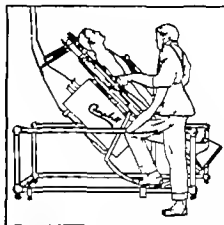
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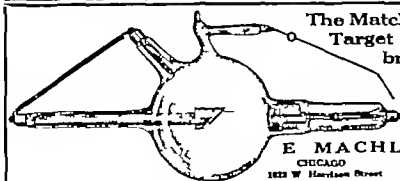
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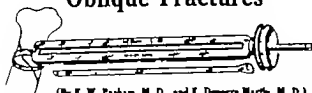
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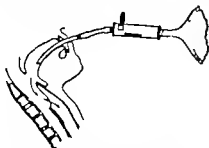
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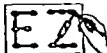
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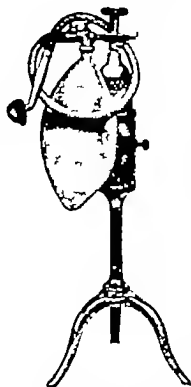
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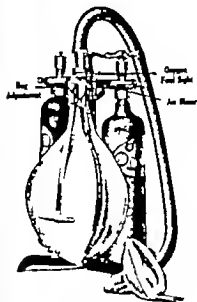
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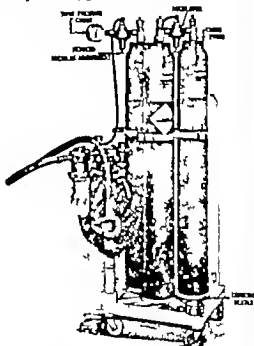
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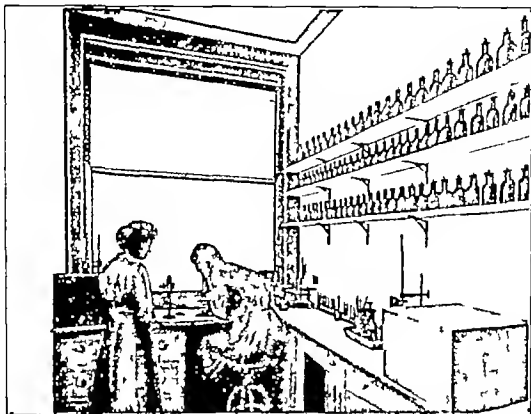
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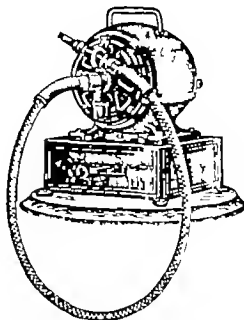
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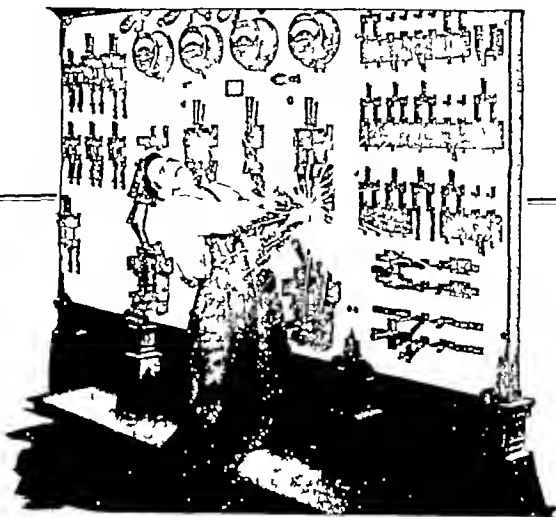
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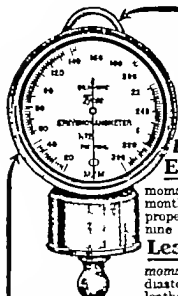
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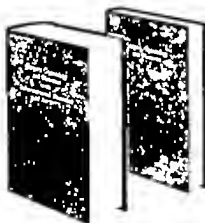
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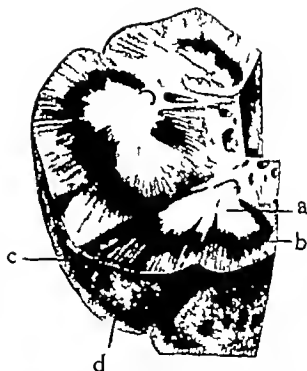


Fig. Nephritic papillitis in cattle. (Orth). A bilateral mixed *clo. bacillus* and *streptococcus pyogenes* infection of hematogenous origin. Necrotic papilla. *a* necrotic papilla. *b* peripapillary zone surrounding necrotic papilla. *c* striations of cortex. *d* mottling of cortex.

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SURGERY, GYNECOLOGY AND OBSTETRICS

AN INTERNATIONAL MAGAZINE, PUBLISHED MONTHLY

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THE ETIOLOGY AND PATHOLOGY OF NON TUBERCULOUS RENAL INFECTIONS¹

By HUGH CABOT M.D. BOSTON

Assistant Professor of Genito-Urinary Surgery, Harvard Medical School, and Chief of Genito-Urinary Department, Massachusetts General Hospital

AND

E. GRANVILLE CRABTREE M.D. BOSTON

Assistant in Genito-Urinary Surgery, Harvard Medical School, and Assistant Genito-Urinary Surgeon, Out-Patient Department, Massachusetts General Hospital

WHILE it is almost literally true that a satisfactory comprehension of the diseases of the genito-urinary tract depends upon a clear appreciation of the nature and probable course of renal infection there is no subject in which there is so little uniformity of opinion and so much confusion. The literature of the subject is stupefying both in quantity and in complexity and anyone who has attempted to master it will be convinced of the fact that it is more likely to confound than to enlighten the reader. Not a little of the confusion arises from a somewhat inaccurate use of terms. Thus the great majority of writers using the term ascending renal infection mean a process which ascends from the lower to the upper urinary tract, but Mallory has for some reason seen fit to use the term to mean ascension from the renal pelvis into the kidney substance and has confused without enlightening. The phrases metastatic, embolic, hematogenous, bloodborne have been used with a looseness which defies comprehension and finally the persistent description of various stages in the same process as different pathological entities has rendered confusion worse confounded. Not

the least serious difficulty has arisen in the almost entire failure of collaboration between the clinician and the pathologist. Thus 10 years ago Orth showed a very interesting understanding of the etiology of renal infections which the clinicians have apparently largely overlooked. On the other hand as in the ancient history of renal tuberculosis the pathologist has wrought havoc with an understanding of this subject because his opinions have been based considerably upon post mortem material which it might be suggested is likely to represent fatal cases and has therefore jumped to the conclusion that a given type of lesion is generally bilateral whereas in fact it is bilateral only in the fatal cases.

A more or less intimate association with the subject of these infections early impressed us with the complexity of the picture which may be presented by kidneys which are the site of long standing infection. It is not rare to find kidneys showing the evidences of at least three infections differing in point of time and often in the nature of the organism involved. That these should present to the pathologist a situation almost too complicated for satisfactory solution is not surprising and

¹Read before the American Association of Genito-Urinary Surgeons, Washington, May 6.

we have come to believe that many of them can be interpreted only in the light of considerable knowledge of the clinical history coupled with great familiarity with renal pathology. In the attempt to solve the intricate problems of renal infections much assistance has been rendered by the use of animal experimentation and yet it has in some hands led to wholly erroneous conclusions which have done considerable damage the error arising very largely from the attempt to draw conclusions from the effect upon animals of organisms whose behavior is very different from that which they exhibit in the human body. Thus, the colon bacillus rarely produces suppurative lesions of the kidney in man while in animals it may readily do so and this has given rise to the quite erroneous assertion that the colon bacillus commonly or even regularly produces abscesses of the kidney. Where so much turns upon the exact nature of the lesion produced a study of the lesions in animals must be surrounded with every precaution, if the conclusions are to have validity. Our experience has led us to the conclusion that it is wholly unsafe to use the same organisms commonly found in human renal infections in carrying out animal experiments and we incline to the view that the safest procedure is to select organisms which produce similar lesions in other organs and reason from parallel rather than from identical lesions. In studying this subject we have come to regard it as important to consider the lesions produced by various organisms upon kidneys previously normal, in order to get a clear understanding. It has seemed to us that in the past, attempts to explain the lesions produced by infection upon kidneys previously damaged has been a potent source of error and that an understanding of the lesions found under these conditions is most likely to come through a study of the lesions produced in previously healthy kidneys. Therefore, in discussing the subject we have divided the field of renal infections into two groups. Group I, including only those kidneys which were previously normal as far as the clinical evidence will permit of a decision, and Group II those in which infection was

grafted upon some other lesion of the kidney such as stone tumor or dilatation due to obstruction.

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Many years ago various observers including Hoffman Roehrig Maas Wiener Rutimeyer and Cohnheim showed that insoluble substances such as cinabar and fat could be made to pass through the healthy kidney. Particles of these substances were found in the capsule of the glomerulus in the tubules, and in the urine. In 1896 Biedl and Kraus showed that the staphylococcus aureus the bacillus coli and the anthrax bacillus passed through the healthy kidney. The same fact was demonstrated for the typhoid bacillus by Lumiere and Abram by Rovsing for the bacillus coli by Cuturi for the same organism and by Patrick for various organisms in the course of typhoid fever. Meyer Walschmann Heyer Kramer Buday Wysokowitch Roliv Brown and Cunningham have shown that in the course of tuberculous lesions elsewhere in the body tubercle bacilli appear in the urine at various times and in varying quantities without any evidence of damage to the kidney. Horney has made a similar observation for the bacillus of leprosy. In this connection should be mentioned an interesting series of observations noted by Swart and Craig that, following the administration of salvarsan to patients with leprosy or patients with tuberculosis, the bacilli appear in the urine in large numbers and the course of the disease is often unfavorably affected. On the other hand Wysokowitch in 1886 experimenting with a variety of pathogenic bacteria including the pneumococcus the typhoid bacillus anthrax bacillus, and the staphylococcus aureus found them appearing in the urine with evidence of the production of kidney lesions. Similar conclusions were drawn by Coccardi in 1888 Pernice and Scagliosi in 1892 Sherrington in 1893 Cotton in 1895 and Jahn in 1910. This array of apparently conflicting testimony has brought certain eminent observers to the conclusion that in the cases

where no lesion was discovered it was because a slight lesion had been overlooked. This we believe to be an entirely unwarranted conclusion. In view of the fact that insoluble substances have been shown to pass the kidneys without damage in view of the fact that many competent observers have passed bacteria through the kidney repeatedly and then examined these kidneys after sacrifice of the animal and in view of the fact that we are daily accepting the clinical evidence obtained by the study of patients in regard to the integrity of their kidneys we cannot avoid the conclusion that bacteria pass the healthy kidney. That they do not do so always or under all conditions simply confirms the well known fact that local conditions in the kidney and general conditions in the organism influence the occurrence or non occurrence of infections. While we are prepared to admit the accuracy of all the observations above quoted they seem to us to prove conclusively that organisms circulate in the blood and pass through the kidney in many cases without producing any lesion and in many other cases with the production of various lesions.

BACTERIA CIRCULATE IN THE BLOOD AND ARE EXCRETED THROUGH THE KIDNEYS WITH LESIONS MILD OR SEVERE

In 1915 Kowitz studying a group of children with infectious diarrhoea found the following sequence of events in five cases.

Blood cultures showed the bacillus coli. Promptly thereafter there appeared in the urine first albumin then bacteria and finally pus. Exploration of the records of the medical services at the Massachusetts General Hospital has yielded us an interesting series of 8 cases of bacillæmia and bacilluria which it may be noted occurred entirely in women. They entered the hospital with the diagnosis of fever of unknown origin.

CASE 1 Woman age 35. Blood culture showed bacillus coli urine profuse growth of the same organism. Physical examination negative except for elevation of pulse and temperature. Recovery.

CASE 2 Woman age 29. Physical examination negative. Temperature 103. Pulse 120. Widal negative. Blood culture unknown bacillus urine bacillus coli stool persistently negative for typhoid bacilli.

CASE 3 Woman age 30. Entrance diagnosis paratyphoid. Blood culture bacillus coli urine culture colon like bacilli. Recovery.

CASE 4 Woman age 23. Sister of Case 3. Entrance diagnosis paratyphoid. Blood cultures lost urine culture bacillus coli. Recovery.

CASE 5 Woman age 30. Entrance diagnosis question of typhoid. Blood cultures profuse growth colon bacillus bladder urine colon bacillus right ureter colon bacillus left ureter no growth. Persist at right pyelitis.

CASE 6 Woman age 35. Entrance diagnosis unknown fever. Temperature 102. Pulse 95. Blood culture colon bacillus urine culture colon bacillus. Recovery.

CASE 7 Woman age 30. Entrance diagnosis acute infection. Temperature 100.5. Pulse 98. Blood culture motile bacillus (bacillus paratyphoid?) urine bacillus coli. Death in one week. No autopsy.

CASE 8 Woman age 62. Entrance diagnosis convulsions. Temperature 100. Pulse 110. Blood culture colon like bacilli urine culture colon like bacilli. Death in one week. Autopsy calculus pyonephrosis bilateral suppurative nephritis.

This group of cases is interesting from several points of view. Most of them were regarded as cases of probable typhoid and attention was particularly directed to this condition. Their blood however failed to show a Widal or to react to cultures of the paratyphoid bacillus and they were finally proved to be due to the other member of this group the colon bacillus. We believe that these cases simulating typhoid and due in fact to the colon bacillus in other words cases of colon bacillus bacillæmia are much more common than has been generally supposed. The records of any large hospital during recent years will show a considerable number of these cases in which clinical symptoms suggested typhoid but the diagnosis could not be confirmed and they were finally discharged cured often with a diagnosis of paratyphoid. A correct solution can be obtained only by careful study of the blood and urine with good technique and particularly when they are seen at an early stage of the disease.

That the colon bacillus can be obtained from the blood in cases of acute pyelonephritis with considerable frequency has recently been shown by one of us (E. G. C.) who in a series of 32 cases obtained positive blood cultures in 40 per cent a ratio larger than that

ordinarily obtainable in typhoid fever which is admitted to be a bacillæmia. One case occurring under our observation and carefully studied throws considerable light upon the natural history of this process.

The patient was a man of 55 with benign enlargement of the prostate gland and residual urine. Cultures controlled by stained sediment showed the urine free from infection at entrance to the hospital. He was immediately placed upon constant drainage with an indwelling catheter. Cultures from the bladder urine were taken the evening of the seventh day up to which time he had complained of no symptoms whatever. These were sterile. At eleven o'clock of the eighth day he complained of a burning sensation in the urethra and two hours later had chill and sudden sharp rise in temperature. Blood cultures were taken two and one half hours from the beginning of symptoms of prostatic irritation and one-half hour after the appearance of the chill and rise of temperature. A pure growth of colon bacilli was obtained. Centrifuged urine obtained from the bladder at the time the blood culture was taken showed no bacteria in stained sediment. Cultures taken from the bladder urine the following morning showed an abundant growth of colon bacilli. Pus was present in very small amount. The renal functional test with phenolsulphonethylphthalein showed a drop in 24 hours of 50 points. The patient complained of right-sided costovertebral tenderness and headache and presented the usual symptom complex commonly called pyelitis, which we believe to be a pyelonephritis. He was allowed to remain on constant drainage for a week longer during which time his phthalein output returned to within five points of its former level. Perineal prostatectomy was then done. The patient made an uneventful recovery until the ninth day when he bled. The wound was packed and bleeding controlled. The temperature rose and the patient died. Necropsy showed anemia and streptococcus septicaemia. The kidneys were pale with normal markings and little, if any dilatation of the pelvis (Fig. A). They were passed by the pathologist as normal kidneys.

This case clearly shows bacillæmia, bacilluria, pyelitis and pyelonephritis. The evidence of pyelonephritis is based chiefly upon the sudden great drop in kidney function which we think may be taken as evidence of acute cloudy swelling of the kidney probably involving chiefly the tubular portion. That this process is short-lived and goes on rapidly to practically complete recovery is suggested by the return of kidney function and conclusively proved by the appearance of the kidney post mortem.

Finally in support of the above mentioned proposition we submit the results of the inoculation of a rabbit with the paratyphoid bacillus alpha. It should be remembered that the paratyphoid bacillus has for rabbits a pathogenicity quite similar to that shown by the colon bacillus in man. The cultures used in this experiment were three year old cultures. At the beginning of the experiment the bladder urine was shown to be sterile. An emulsion of the organisms, about 3 cubic centimeters in amount was introduced into the ear vein on three separate occasions during a period of five weeks. Following each infection the organisms appeared in the urine promptly and in enormous numbers. Five days following the last injection the animal was sacrificed. Sections of the kidneys carefully studied showed practically no lesion and were certainly within normal limits for laboratory animals (Fig. B).

ASCENDING INFECTION BY WAY OF THE URINARY PASSAGES

The theory that infections reach the kidney by direct extension from the lower urinary passages has acquired the dignity associated with old age and has been a widely held and attractive theory because of its extreme anatomic simplicity. We believe that it can be shown that its simplicity is apparent rather than real, that most of the cases in which it has been supposed to occur were based upon a complete misconception of the facts and that this method must in reality be regarded as exceptional. It has been customary to assume that in this method of renal infection the bacteria reached the kidney by one of three ways:

1. By continuity from a bladder infection by direct extension of the process within the lumen of the ureter
2. By the transportation of the bacteria in a column of urine which is supposed to exist within the ureter. By this conception the bacteria float upward, apparently impelled also by their own motive power in contemptuous disregard of the descending stream of urine and ureteral peristalsis.
3. By reverse peristalsis within the ureter. This, of course presupposes obstruction of

the ureter since as far as we know there is no warrant for the assumption of reverse peristalsis in the absence of obstruction. That reverse peristalsis occurs in the presence of obstruction we believe to be a demonstrated fact, the best evidence of which in our personal experience has been the movement of ureteral calculi from the kidney to the lower end of the ureter and then back again a journey which could hardly be expected to take place under any force other than reverse peristalsis.

The whole theory of ascending infection rests primarily upon the proposition that infection of the bladder takes place under a great variety of conditions unassociated either with trauma or with retention for unless a pre-existing cystitis is assumed the whole proposition falls to the ground as applied to a great majority of the cases.

More than a quarter of a century ago Rovsing and Melchior showed that (a) experimentally cystitis could not be produced in animals without retention or trauma, that (b) with retention of urine experimentally produced there generally resulted no pyelitis, that (c) trauma to the bladder with or without retention produced pyelitis and pyelonephritis. In passing it should be noted that in these later cases sections of the bladder wall showed extensive hæmorrhage with bacteria in the blood and lymph channels, an observation the importance of which will later appear.

Baurelien, concerning himself wholly with the lesions produced by the tubercle bacillus, drew three conclusions: (1) A bladder with intact mucosa cannot be infected. (2) With the flow of urine unobstructed tubercle bacilli cannot reach the kidney through the ureter. (3) Obstruction of the urinary stream will as a rule result in urogeous ascending infection of the kidney. This last conclusion implies a dilatation of the ureter and an incompetent ureterovesical valve.

Draper and Braasch, in a very thorough piece of work in which they attempted to produce ascending renal infections, wholly failed to do so except by maintaining an abnormal amount of pressure in the bladder over a long period of time.

It thus appears that the experimental work

wholly fails to support the assumption of ascending infection by means of the urinary passages. When produced as by Rovsing and Melchior there is no warrant for the assumption that it ascended since the blood and lymph channels were shown to contain bacteria and it is far more probable that the bacteria reached the kidneys by one or both of these routes. It is notorious that bacteria in the bladder, whether introduced from above or from below, will over a long period of time produce lesion. There is a mass of clinical evidence showing that tubercle bacilli coming from an infected kidney will pass for years through the bladder without producing a lesion. Of late years when the cystoscope and ureter catheter have made accurate diagnosis of conditions in the upper urinary tract possible a multitude of observations have been recorded of colon bacillus pyelitis and pyelonephritis from which the colon bacillus passed to and through the bladder for years without producing a lesion.

A recent communication by Hess, in which he described the result of investigations of the bacteriology of bladder immediately following cystoscopy, throws considerable light upon this question. He showed that in the first days following instrumentation bacteria of various kinds could be found in the bladder with regularity, that they produced neither the symptoms nor the sign of cystitis and that in a few days they disappeared. We have become wholly accustomed to regarding the cystoscopic examination of the bladder under normal conditions as a harmless procedure. If these observations of Hess be confirmed it shows that the harmlessness consists not in the aseptic character of our procedure but in the vitality of the vesical mucous membrane and its ability to shake off the milder degrees of infection.

We do not intend to convey the impression that we believe that ascending infection from the lower to the upper urinary tract must be wholly discarded for there are two conditions under which it is theoretically possible and practically probable. The first of these is ureteral obstruction which may theoretically be of three types: that due to stone, that due to inflammatory stricture, and that produced

by the abnormal constriction of the lower end of the ureter by hypertrophy of the bladder such as is seen in diverticulum, in tuberculous and in obstructive conditions at or below the neck of the bladder. In hollow viscera elsewhere in the body obstruction is followed by reverse peristalsis with singular regularity and it is but reasonable to assume that the ureter, a hollow muscular organ, behaves in a similar fashion. Further warrant is given to this belief by the observation in regard to stone in the ureter above referred to. Now under conditions of reverse peristalsis bladder infection with extension by direct continuity, to the lowest portion of the ureter would give rise to conditions highly favorable to renal infection if assisted by reverse peristalsis. The other condition clearly opening the way to ascending infection is incompetence of the ureterovesical sphincter such as undoubtedly exists in a certain number of cases of obstruction at or below the vesical outlet. In these cases the dilatation has become so extreme that the renal pelvis is for all practical purposes in direct open communication with the bladder cavity and any condition existing in the latter will promptly be communicated to the former by the simple method of back wash. Under these circumstances, if the kidney is not already infected it will promptly become so.

The pyelitis, so called, of pregnancy and the equally improperly termed pyelitis of childhood have been the great strongholds of the ascending infectionists. Their theory has been based chiefly on anatomical fact unsupported by clinical or experimental evidence. The short urethra and the comparative ease with which the region of the urinary meatus might be contaminated with the colon bacillus, together with the fact that in the adult female vesical irritability is often the first thing to attract attention, have been the two important premises. It has not been shown that the cystitis antedates the pyelitis, for the good and sufficient reason that such is rarely the case. Furthermore should it be shown that the cystitis was primary there is no basis either in man or animals for the assumption that with neither retention nor trauma ascension could occur.

The fact that this disease occurs with far greater frequency in the female whether child or adult is important but its significance has been wholly misunderstood. It is interesting to note that in the eight cases reported above of proved bacillæmia and bacilluria all were women. In the adult female we think there can be no doubt that the conditions normally existing in the large intestine are more favorable to the occurrence of bacillæmia than in the male. There is as yet no adequate explanation of the greater frequency of these infections in the female child but we think that existing evidence points to the view that this explanation will be found not in the anatomical peculiarities of the female urethra, but in the anatomical peculiarities of the female intestine.

ASCENDING INFECTION BY THE LYMPHATICS

For many years occasional observers have called attention to the possibility that bacteria might reach the kidney by way of the lymphatics. It has perhaps been most extensively discussed in connection with renal tuberculosis but of late years the discussion has been extended to include other organisms and a variety of publications showing careful anatomical study have tended to support the theoretical contentions.

Mascagni showed that the lymphatics of the upper ureter drained into the lymphatic system in the region of the kidney pelvis and that organisms might reach the kidney along these channels. He also showed that the lymphatics of the lower ureter drained into the lymph nodes of the anatomical pelvis.

Sakata confirmed the above observations and further showed that the system of lymphatics of the upper ureter and the system of lymphatics of the lower ureter and bladder were connected by an intermediate chain of lymphatics embracing the central portion of the ureter. It is easy however to exaggerate the importance of this observation since Sakata's work shows that this chain is not continuous, but is, on the contrary, highly interrupted. Organisms in order to extend from bladder to kidney by this route would have to pass through several systems of lymph-nodes, contingency which importantly decreases the probability of such an occurrence.

Supinura's series of cases and showed that in the presence of acute cystitis the lower third of the ureter was constantly involved, apparently through the medium of the lymphatics. It drew

this conclusion because there was very slight involvement of the mucous membrane of the lower ureter while the lymph-channels of the muscularis and adventitia were extensively involved.

Francke has shown a lymphatic communication between the right kidney capsule and the adjacent ascending colon.

Kumata has demonstrated a system of superficial and deep lymphatics in the fatty capsule of the kidney. This system apparently drains away from the kidney communicating with the subdiaphragmatic lymphatics.

A recent paper by Eisendrath states his belief that he has demonstrated that bacteria ascend by the lymphatics from the bladder to the kidney and produce renal infection. After a careful study of this paper we regret that we are entirely unable to follow him to his conclusion. The method by which the lesions were produced is nowhere stated. The lesions are not strikingly different from those which are found in blood born infections and finally the evidence which he submits of the lesions of the kidney is so meager and differs in such important particulars from the infectious lesions ordinarily found in the kidney that we must question their similarity.

Upon the framework of the above mentioned anatomical observations several writers have attempted to erect a theory of lymphogenous infection of the kidney. Though the framework is valid in its individual members the complete structure seems to us frail and insecure. It is generally believed and upon sufficient evidence that the lymphatic currents throughout the body follow the flow of blood in the blood vessels. Unless we are prepared to disregard this doctrine it will be difficult to trace lymphatic processes over areas which are totally lacking in continuous vascular channels. Now there are no blood vessels running an uninterrupted course from the bladder to the kidney. The blood supply of the ureter is distinctively segmental and the only vessels which run in this general direction are the spermatic vessels in the male and the ovarian vessels in the female. These run in different sheaths and would be with difficulty accessible to organisms passing outward from the bladder. Furthermore assuming the probable fact that organisms reach the lymphatics about the bladder and over the lower segment of the ureter the probability of their reaching the blood stream rather than continuing in devious lymphatic channels seems to us overwhelming. That

organisms pass from the bladder into the perivesical lymphatics reach the blood stream and ultimately the kidney we not only believe but are prepared to show¹ and this possibility must always be reckoned with. Reasoning from lesion produced by lymphatic infections elsewhere in the body progress by this method is comparatively slow and on account of the interrupting lymph nodes is more likely to produce highly localized lesions than lesions spreading rapidly over long distances and flooding a distant area with organism.

Finally the evidence of the lesions actually produced in urinary tuberculosis is enlightening. It is generally recognized that the involvement of the ureter is earliest and most marked at its two extremities and it is not uncommon to find a central portion of the ureter wholly or comparatively free from tubercular disease. Those who have regarded the work of Francke concerning the lymphatic communication between the ascending colon and the right kidney as conclusive seem to us to be reasoning upon highly insecure premises. Arbiter has shown that when organisms leave the intestine by the lymphatics they rapidly appear in the blood and this tendency is amply confirmed by a large series of observations which concern themselves not only with the migration of bacteria of the intestine into the lymphatics but with the ways in which foreign proteids leave the intestine under abnormal conditions.

Thiele and Embleton have shown that after peritoneal infections the organisms rapidly reach the blood stream and are excreted by the normal kidney. If however the thoracic duct be opened so that bacteria can escape no such excretion occurs.

If for a moment we disregard the large probability that bacteria leaving the intestine by the lymphatics will reach the blood stream rather than the kidney we must yet believe that a lesion of the kidney thus produced would in all probability be a localized lesion rather than a widespread diffuse lesion such as is notoriously produced by bacteria of intestinal origin.

¹See author's case p. 64.

WHY ASSUME THAT COCCI GENERALLY REACH THE KIDNEY BY THE HÆMATOGENOUS ROUTE, WHILE ASSUMING THAT COLON BACILLI GENERALLY REACH THE KIDNEY BY ASCENSION FROM THE BLADDER?

It has been long assumed and following the work of Brewer has been almost universally admitted that the staphylococcus infections of the kidney are of hæmatogenous origin. These infections have been shown to be associated with furunculosis, carbuncle, and various septic foci elsewhere in the body. The identity of the organisms in both places and the impossibility of sustaining any assumption of transference other than the blood has led to these lesions being regarded not only as hæmatogenous lesions but the proposition has been even reversed and the hæmatogenous lesion has become almost synonymous with coccus infection. On the other hand the infection of the kidney with the colon bacillus, of which the purist types are the pyelonephritis of infancy and pregnancy has been regarded as ascending chiefly because of the delightful simplicity of the assumption. If however one inquires as to the evidence of the hæmatogenous origin of both these types of infection one is at once struck by the fact that the hæmatogenous origin of colon bacillus infections has been demonstrated beyond the shadow of a doubt, the organisms having been repeatedly found in the blood and subsequently in the urine while as far as we are aware there are but few cases on record in which the cocci concerned in the so-called hæmatogenous coccus infection of the kidney has been captured during his journey through the blood. While this should not be taken as in any way tending to invalidate the hæmatogenous origin of the coccus lesion it seems to us to at once put upon the defensive those who would assume that colon bacillus infections of the kidney are produced by any method other than the hæmatogenous one. At least as far as concerns the pyelonephritis of the group above referred to we shall later submit evidence which seems to us to show that they can be produced only by organisms reaching the kidney through the blood stream and that the theory of ascension is wholly mythical.

POSSIBLE SOURCES OF CONFUSION IN PREVIOUS STUDIES OF RENAL INFECTION

That the literature of renal infections is both confusing and confused no one who has attempted to digest it is likely to deny. There appear to us to be two chief sources of this confusion first a considerable lack of uniformity in the use of terms which at times amounts to a use so loose as to be positively misleading and second an attempt to study complicated and mixed lesions which are likely to almost defy analysis.

1. At the outset, therefore of the discussion of our own findings we desire to state clearly our understanding of the terms emboli, metastatic, hæmatogenous, excretory lymphogenous and ascending as applied to renal infection.

A suppurative lesion of the kidney we regard as embolic when a definite embolus shown to contain micro-organisms has been demonstrated in a blood-vessel at the apex of the lesion. This term has we think frequently been used to cover a mucous lesion which were a no proper sense emboli in character.

A metastatic lesion of the kidney we understand to mean a suppurative lesion produced by an organism of the same character as one concerned in a demonstrable suppurative lesion elsewhere in the body.

The term hæmatogenous we hold to mean simply that the organisms reach the kidney by the blood.

An excretory lesion is one produced during the process of excretion of organisms by the kidney. It will thus be seen that the terms hæmatogenous and excretory cover very nearly the same ground. Clearly no excretory lesions can occur unless the organisms have arrived by the blood and we expect to show that organism which arrive by the blood and do not produce emboli very generally do produce excretory lesions.

Lymphogenous covers all the suppurative processes demonstrated to be produced in the kidney by bacteria which have arrived solely via the lymphatics.

And finally ascending infection in which abused term, we hold to mean the direct ascension of organisms from bladder to kidney by the lumen of the ureter. This process may involve either a direct extension along a mucous membrane or a direct transference from bladder to kidney with the urine as vehicle.

2. We believe that a comprehension of renal infections is very much simplified if they be separated into two main groups. Group I including all those infections of the kidney which occur in an organ previously

sound and Group II those infections which occur in a kidney previously unsound such as those damaged by stone tumor obstruction or chronic nephritis.

A classification of the infections occurring in Group I has seemed to us after a not inconsiderable experience to be comparatively simple. We have a rule been able to come to a satisfactory conclusion as to the cause and nature of the process and to arrange the lesions in an orderly and comprehensible fashion. On the other hand there have been many cases falling under the classification of Group II in which the complication of lesions of various dates and of essentially different pathological characteristics was such as to largely defy satisfactory explanation. For example a kidney long the resting place of a stone may show a variety of practically healed lesions the original nature of which must be permanently in doubt. Coupled with these may be two or even three more recent infection overlapping each other in position and perhaps in point of time and giving a picture so confusing as to be quite beyond us. It may well be that a more extensive study of the cases in Group I will enable one to make a fairly accurate guess as to the probable cause of the various lesions of such a kidney as above described.

A STUDY OF THE LESIONS ACTUALLY FOUND IN RENAL INFECTIONS.¹

For this study we have utilized a group of 118 cases classified as suppurative nephritis. These include both cases studied at autopsy and specimens obtained at operation so that we have not been confined to one particular type of material. Of these 118 cases we have been obliged to discard 58 either because they represented material obtained at autopsies done several years ago from which the paraffin blocks had been lost or the lesions were too chronic and too complicated to lend themselves satisfactorily to classification or finally those in which we were unable

to demonstrate bacteria. There thus remains a group of 60 cases divided as follows:

- 23 were caused by and were demonstrated to contain staphylococci alone
 - 4 streptococci alone
 - 3 staphylococci and streptococci
- 25 were demonstrated to contain mixed cocci and bacilli —
 - 10 of these showed staphylococci and bacilli
 - 4 showed streptococci and bacilli
 - 2 showed staphylococci streptococci and bacilli
- 5 showed bacilli only —
 - 3 the bacillus coli and
 - the bacillus coli and another bacillus clearly a pyogenic organism

I EVIDENCE OF THE PRODUCTION OF LESION DURING THE PROCESS OF EXCRETION OF BACTERIA

The case for this proposition was clearly stated by J. W. Thomson Walker in his work on *Surgical Diseases and Injuries of the Genito-Urinary Organs* p. 120.

It is now recognized that bacteria are constantly entering the lymphatics from the intestine and other sources in healthy individuals. The bacteria may be destroyed at the point of entry or at the lymphatic glands, or they may pass through the lymphatic system into the blood stream in which they circulate. The endothelium and cells of the liver destroy bacteria which are introduced by way of the portal system and bacteria are excreted in the bile. Similarly a function of the renal parenchyma especially of the convoluted tubules is to remove the bacteria present in the systemic circulation.

It has been proved that the virulence of these bacteria is not reduced in their passage through the body. The excretion of bacteria in this way does not give rise to any symptoms which show that the kidneys are damaged. It is stated however as the result of experiments on animals, that the secreting membrane is injured by the passage of the bacteria. The damage is probably slight and is repaired partly or completely by the regenerative powers of the kidney. In some cases long-continued excretion of bacteria or their toxins may be the cause of patches of interstitial nephritis in the kidney.

It is held that the excretion of bacteria does not cause pyelonephritis unless some additional factor is present. Predisposing causes of pyelonephritis are traumatism excessive functional activity the elimination of toxic bodies such as cathartics previous disease of the kidney such as urinary obstruction calculus, new growth. It is exceptional

¹ All the following case reports are descriptions and macroscopical examinations of sections re-ported from the autopsy protocols of Dr. J. H. Wright and Dr. Oscar Richardson. Where specimens from operations are used the above descriptions re-ported from the report detail: 1 by Dr. Whitney and Dr. Hart all of the following are of the surgical pathology department. Where more detailed observations than is possible in routine work are required they are given under the heading of sections stained for bacteria which have appended.

however to find any of these factors present and it is more likely that chronic toxemia from constipation, an excessive dose and an exceptionally virulent strain of bacteria, are the decisive factors.

It was also clearly stated by Orth in 1893

The question of the method by which bacteria reach the tubules in the pyramidal zones can, in my opinion, only be explained by assuming their passage from the blood into the capsule of the glomerulus and their being carried along into the collecting tubules with the urine where they group together become arrested, and continue to grow

We append three cases which seem to us to clearly support the doctrines thus laid down.

CASE 1. Autopsy No 3539 West Medical, 193300. Female, age 36 November 5 1915. *Diagnosis* diabetes mellitus. Past history negative save for present symptoms which appeared four years ago. Present illness—only symptoms are those of diabetes. Physical examination negative as regards urinary tract. Patient was made and kept sugar free with great difficulty and lost weight and strength under the treatment. *Urine examination* at entrance showed sugar 7.8 per cent diacetyl acid and acetone no albumin occasional pus-cell. *Urine examination* January 14 1915, showed traces of albumin but scanty sediment containing only a few cells no sugar. Temperature remained normal to subnormal from entrance to January 9 when it suddenly became a swinging septil temperature ranging from normal to 102. Blood cultures were negative white count never above 9000. Renal function phthalein fell to 15 per cent for two hours. Death attributed clinically to acidosis and terminal infection. *Clinical diagnosis* diabetes mellitus. Terminal infection.

Autopsy 95 hours post mortem. *Anatomical diagnosis* diabetes mellitus. Lobar pneumonia, acute pleuritis with effusion, arteriosclerosis fibromatosis of uterus, chronic peritonitis and chronic salpingitis, chronic interstitial hepatitis, chronic interstitial pneumonia, nephritis papillaris mycetozoa, colon bacillus and streptococcus septicaemia.

Kidneys (Fig 1 frontpiece). Combined weight 500 grams. Organs are enlarged. Capsules trip easily leaving a fairly smooth dark brownish surface generally mottled with small brownish areas dotted over which are numerous grayish points. The surface of one kidney shows in two places small, pale yellowish white areas 3 to 5 millimeters across. On section the tissue is of increased consistence and shows in the regions of nearly all the pyramids of one kidney and in many pyramids of the other numerous pale yellowish, necrotic, homogeneous, rather firm masses of various size and shape, some of them measuring only a few millimeters across, and others occupying the entire pyramid. As a rule the masses reach to within 3 or 4 millimeters of the cortex although in two places there are slender prolonga-

tions of the masses through the cortex to the surface where they appear as the two pale yellowish areas previously mentioned. Margins of these masses in the pyramidal region are slightly serrated and the mass extends to the tip of the pyramid. The tissue bordering the mass is purplish black and homogeneous. From this blackish area dark lines extend in places up through the cortex and are in relation with the blackish areas mentioned as present on the surface. The cut surface of the cortex shows generally pale brownish to dark brownish background mottled in places with the blackish areas mentioned. The kidney markings are visible. Pelvis and ureters negative. Bladder negative.

Bacteriological part. Culture from heartblood growth fecal bacilli and streptococci spleen colon bacilli kidney tissue colon bacilli. *Microscopic sections* show on the surface of the cortex, in the regions previously mentioned mottling rare infiltration of the interstitial tissue with polymuclear leucocytes and lymphocytes. Extending from these areas in the interstitial tissue between the tubules are lines of similar infiltration extending down to meet the areas of necrosis. The glomeruli are normal, the tubular epithelium of the tubules of the cortical region is for the most part unchanged. In some of the convoluted tubules are masses of desquamating epithelial cells and leucocytes (Fig 2). In many cases these tubules and their contents appear to form the centers of abscesses surrounded by tense polymuclear infiltration of the interstitial tissues. The blood vessels throughout the cortex are much engorged. In the region of the distal convoluted tubules and the bases of the pyramids there is an extensive suppurative process extending transversely across the base of the pyramid, in some instances completely separating it from the cortical tissue. This area corresponds with the previously mentioned purplish black area seen in gross section (Fig 3). There is complete transverse necrosis of all structures including blood vessels tubules, and interstitial tissue to the level of the bases of the pyramids (Figs 3 and 4). The blood vessels are often found ruptured with liberation of blood corpuscles into the necrotic area and there is profuse infiltration of polymuclear leucocytes, fragments of renal epithelium, and red blood cells. The necrotic tips of the pyramids previously mentioned show a homogeneous smooth structure with necrosis as well as fragmentation of nuclei and loss of cell outline without any evidence of infiltration (Fig 5). The blood vessels of the pyramids are empty. The lumina of the straight tubules are filled with masses of detritus. In some areas in which the necrotic process is not so complete the contents of the tubule is the center of abscess formation (Fig 6). The cells of the tubule, containing the masses of detritus, and the interstitial tissue as well as the neighboring tubules show a narrow zone of necrosis outside of which is extensive infiltration of polymuclear cells. *Sediment stained* for bacteria show very rarely a short chain of streptococci in the blood stream and

capillary tufts of the glomeruli. The masses of cells found in the convoluted tubules of the cortex are shown to contain large numbers of bacilli and a few chains of streptococci (Fig. 1). In many places tubules which contain no cell detritus show considerable numbers of bacilli within the epithelial cells. A few streptococci and bacilli are found in the infiltrated interstitial tissues. The necrotic area at the base of the pyramid already described shows an extensive bacterial invasion of bacilli and streptococci but with fragments of tubules loaded with bacteria apparently covering the center of necrosis. Streptococci are much more numerous in this region than in any other portion of the kidney. The masses of detritus in the tubules of the pyramids are seen to consist almost entirely of large masses of bacilli (Fig. 5). Very few streptococci are found in this region.

NOTE.—The explanation of the pathological picture presented by this kidney seems to point to an early infection with colon bacilli in which the bacilli have been arrested through normal glomerular function. Some have been arrested high in the convoluted tubules many more in the distal portion of the tubules while large numbers have reached the straight tubules and some even to the pelvis of the kidney. A subsequent infection with streptococci in which most of the streptococci have also passed the glomerulus seems to have taken place. The streptococci have been arrested in the already damaged distal convoluted tubules and have produced along with the colon bacilli an extensive upward process at the bases of the pyramid with resulting complete transverse lesion of all structures at that level. Inasmuch as the blood supply of the pyramid is from below downward from the pole of each lobe at the base of the pyramid the transverse lesion as with rupture of blood vessels at this point has resulted in anemia and subsequent necrosis of the pyramid. There are but two areas in this kidney in which a justifiable embolism need to be considered namely the two areas of pyramidal necrosis of the pyramids previously described.

CASE 2. *Intopsy No. 342.* East Medical 967-89. Female, age 21, January 13, 1915. Admission diagnosis pneumonia arthritis. Present illness. No previous urinary difficulties. Normal delivery four days ago following which the patient began to have abdominal pain with chills and fever. Urine acid, very slight trace of albumin, many granular casts, red blood-cells and leucocytes. Blood culture no growth. Culture from cervix showed staphylococci and bacilli, one a fusiform bacillus. Smear from cervix showed many staphylococci and streptococci. Patient died on seventh day. *Chief diagnosis.* Puerperal septicemia, bronchopneumonia, endocarditis, septic arthritis. *Autopsy 94 hours post mortem.* Anatomical diagnosis. Puerperal septicemia, diphtheritic endometritis, rupture of vagina with necrosis of perivaginal tissue, septic arthritis, diphtheritic colitis, soft spleen with infarcts, pyelitis, nephritis, papillitis, mycotic streptococcus septicaemia.

Kidneys much enlarged. Combined weight 558 grams. Capsules strip leaving a pale brownish red smooth surface. On section the tissue is swollen

but markings are retained. The cortex is not narrowed. The cortices are pale brown red with a slight purplish cast. The pyramids are dark brown and in the region of the apex many of them show pale yellowish opaque smooth discrete and confluent streaks. The glomeruli show no definite prominence. The pelvis shows injection of the blood vessels with minute reddish spots. The ureters and bladder are normal.

Misopimplia examination. Throughout the whole tissue there is marked edema. The cortical portions of the kidney show normal glomeruli with some congestion of the blood vessels and the great majority of the cortical tubules free from pus but the epithelium shows cloudy swelling. In one portion of the kidney there is an area of extensive infiltration and necrosis of all renal tissue extending transversely across a portion of one of the pyramids. In this area the tubular epithelium is necrotic, the blood vessels are ruptured and the portion of the pyramid beyond is anemic. Above the area of necrosis the blood vessels are congested. In the remaining pyramids there are fine streaks of polymorphonuclear infiltration extending from the bases of the pyramids toward the apex (Fig. 7). In the least extensive of these processes the lumen of the tubule is seen to contain clumps of bacteria surrounding which is a lens-shaped area of necrosis including the epithelium of the tubule and the interstitial tissue on each side sometimes extending far enough to include the adjacent tubule on each side. Beyond this area is a border of pus-cell infiltration. Occasionally throughout the cortical regions there are a few tubules containing pus-cells.

Bacteriological report. Cultures from the spleen show profuse growth of streptococci and question bacilli. Cultures from the heart blood show profuse growth of streptococci.

Sections stained for bacteria show a few streptococci and bacilli without attending suppurative processes in the glomeruli and tubules of the cortex. In some instances considerable numbers of these organisms are found in the tubules containing the pus-cells previously described (Fig. 8). In the area of transverse lesion of a portion of a pyramid previously described the tubules at the level of the necrotic area are found in many cases almost completely destroyed yet the portions of the tubular epithelium remaining present the picture of necrosis due to the presence of a large number of streptococci and a few bacilli within the lumen. Between these remnants of tubules is extensive infiltration with polymorphonuclear leucocytes, fragments of renal epithelium and some free blood. The bacteria found in the whole area of necrosis just described are chiefly situated in the remnants of tubules with a few scattered bacteria among the blood and pus-cells between the tubules. In the anemic area at the tip of the pyramid just described the blood vessels are entirely empty. There is no infiltration of the interstitial tissue. The tubules consist of large plugs of streptococci and bacilli the former greatly

predominate. In the small lozenge-shaped areas in the region of the straight tubules previously described the central area, that is the lumen of the tubule, is seen to consist of large numbers of streptococci and a few bacilli. Surrounding this group of bacteria is to be seen necrotic tubular epithelium surrounded by a zone of pus-cells. Among the pus-cells of the periphery bacteria are found with great difficulty. The pelvis of the kidney contains streptococci and bacilli.

CASE 3 Autopsy No 3575 West Surgical 307462 Male, age 22 March 26, 1906. *Admission diagnosis* Carbuncle of neck. *Present illness.* N previous urinary symptoms. Carbuncle of neck one week's duration. *Operation.* Incision of carbuncle followed by secondary operation for cellulitis of neck. Patient died fifth day. Culture from carbuncle, staphylococci. *U. inc.* acid, albumin, slightest possible trace rare epithelial and pus-cell. *Clinical diagnosis* septicemia.

Autopsy 18 1/2 hours post mortem. Anat. micro diagnosis *Operation wound* carbuncle of neck, abscesses of lungs, myocardium, kidneys, and rectus muscle, small mural thrombus right ventricle, acute pericarditis, peritonitis, soft spleen, staphylococcus septicemia.

Kidney Combined weight 306 grams. Capsules strip easily. Surfaces show at several points minute yellowish spots situated singly and in groups. On section these are seen to be the surfaces of small collections of pus. Usually they arise within the cortex but in many instances they extend down often within the central portion of a pyramid as far as the middle of the pyramid. Markings retained cortex not narrowed. The pelvis, ureters, bladder and urethra are negative.

Microscopic picture in section. There is edema with some few areas of acute degeneration throughout the otherwise normal kidney tissue. Numerous sections show the presence of abscesses, mostly in the cortex (Figs. 9, 10, and 11) some in the pyramids and one or two at the tips of the pyramids (Fig. 12). In none of these is there evidence of embolism. The majority of the abscesses of the cortex appear to take origin in glomeruli. The abscess is surrounded by a generous polymorphous clear infiltration. In most instances the abscess is situated a few millimeters below the surface (Fig. 9). In these instances the tubules leading down into the kidney substance are seen filled with polymorphonuclear leucocytes and surrounded by considerable polymorphous infiltration of the interstitial tissue (Fig. 11). These tubules often lead downward to a second and even third abscess apparently of more recent origin than the one near the surface (Fig. 12). These secondary abscesses show the tubules both above and below them to be filled with polymorphous clear leucocytes to a considerable distance from the abscess. In one instance a third abscess was found located just beneath the mucosa of the pelvis in the tip of the pyramid and showing a fine line of interstitial pus-cell infiltration connecting it with the overlying

two abscesses (Fig. 13). A noteworthy observation found with constancy is that where an abscess is situated a few millimeters below the surface of the kidney the tubules above, although they may be surrounded by pus-cell infiltration do not contain pus (Fig. 9) while those tubules below the abscess contain considerable pus (Fig. 10).

Bacteriological facts. Cultures from the heart blood, operation wound, abscess of the rectus muscle and fluid from the peritoneal cavity show profuse growth of staphylococcus albus.

Sections stained for bacteria show only staphylococci. These are found in large masses within the abscesses, are almost universally found within the tubules containing pus, are occasionally found in apparently undamaged tubules immediately beneath abscesses, and are found in large plugs apparently arrested within the tubules at the tips of the pyramids. The pelvis contains considerable number of staphylococci.

2 THE LESIONS PRODUCED BY PYOGENIC ORGANISMS DIFFER IN ESSENTIAL PARTICULARS AND ARE DISTINGUISHABLE FROM THOSE PRODUCED BY NON PYOGENIC ORGANISMS

In much of the literature of renal infections one must inevitably infer that the authors believe that no definite distinction can be drawn between lesions produced by different types of bacteria. Thus Mallory in his *Principles of Pathological Histology* p. 573 says:

The lesions produced by a number of organisms may closely resemble one another. On this account an etiological classification is ordinarily carried out with only a few organisms such as the tubercle bacillus and *treponema pallidum*.

Following the same idea he says somewhat later:

Infectious agents which most commonly produce lesions of the kidney are the staphylococcus aureus, the streptococcus pyogenes, the bacillus coli, and the tubercle bacillus. Other organisms which occur less commonly are micrococcus lanceolatus, the bacillus m. osus capsulatus, actinomyces, and *treponema pallidum*.

Thomson Walker has this to say upon the subject of the bacteriology of renal infections:

The bacillus coli communis is the most common cause of renal infection occurring in 75 per cent of cases. The next most frequent are the staphylococcus (especially the aureus) the streptococcus, the proteus of H. user and the bacillus pyocyaneus.

A little later under the heading of Pylitis of Pregnancy he says:

The bacteriology is similar to that of other renal infections.

In contradistinction to these views we believe that the lesion produced by the pyogenic and pyogenic bacilli, the pyogenic group, differ essentially from the lesion produced by non-suppurative organisms, chiefly the colon typhoid group.

3. THE LESIONS PRODUCED BY THE PYOGENIC GROUP

These lesions consist of perinephritic abscess, capsular abscess, capsule, cortical abscess, septicaemia and diffuse suppuration. In support of this proposition we submit case 4 to be inclusive.

CASE 4. *Sp. men.* 15 3-30 West Surgical 93-3 Male age 40 February 6 1901 Admission diagnosis: Stone in right kidney. *Present illness.* No previous bladder symptoms. Three months ago sudden sharp non-radiating pain in right flank accompanied by nausea and vomiting with temperature which has continued. He has had some haematuria. *Physical examination.* Shows much spasm and enlarged kidney on right. *Urine at admission.* Aid very light trace of albumin, many leucocytes, rare red blood-corpuscle. *Cystoscopy.* Bladder normal, right kidney infected with staphylococci, renal pelvis not abnormal, which excludes tumor and pyonephrosis.

Diagnosis. Staphylococcus infection of right kidney, nephrectomy advised. *Ray* showed right kidney enlarged, no evidence of stone. *Culture* from urine showed staphylococcus pyogenes aureus. *Operation.* Nephrectomy. Kidney found enlarged, covered by a thick fibrous capsule which was oedematous. Capsule which was 1 to 2 centimeters thick stripped on with difficulty and several small abscesses evacuated in the process. The kidney was large, whitish, with red yellow mottling. The pelvis was not dilated, the ureter was normal. Uneventful recovery.

Pathological report. A somewhat enlarged kidney with adherent perirenal fat. Sections show multiple abscesses scattered throughout the cortex and medulla. Intervening tissue opaque. Examination shows extensive infiltration with round cells with here and there abscess formation. Tubular epithelium is swollen. Multiple abscesses present.

Sections stained for bacteria. Show many staphylococci in clumps in the abscesses. A few bacteria are to be seen in the areas of infiltration above described. These areas show subacute infectious processes with obliteration of the tubules to such an extent that the bacteria outside abscesses can

not be located with a certainty. Cocci are present in the pelvis without any evidence of pyelitis.

CASE 5. Autopsy No. 10 West Surgical 331-111 Male age 60 March 10 1901 *Present illness.* Septicæmia two weeks duration. On admission 101.5 Pus from hand showed staphylococcus pyogenes aureus and bacilli. Patient died on sixth day with symptoms of pneumonia. *At autopsy.* 55 per cent hand metastatic pneumonia.

Autopsy. hour post mortem. Anatomical diagnosis: Gangrene of finger, phlegmon of arm, secondary abscess, sternoclavicular articulation and upper connective tissue abscesses, pneumonia and kidneys acute hyperplasia of spleen.

Kidneys. Considerably enlarged. Capsules strip easily revealing numerous small abscesses in the substance of the kidneys. On section similar abscesses are seen scattered irregularly through the cortex and less abundantly in the pyramids. Cortical tissues opaque and swollen.

Bacteriology. Abscesses of kidney and lung and heart blood show growths of staphylococcus pyogenes aureus.

Staphylococcus aureus. Numerous staphylococci in the abscesses, sometimes in the bloodstream. The majority of glomeruli and tubules are apparently undamaged. Many abscesses in the pyramids appear from the location of bacteria to take origin from the lumen of the tubules. Many epithelial cells are filled with phagocytosed cocci. In one or two areas abscesses appear to take origin in the interstitial tissue in one of which an embolus can be demonstrated.

CASE 6. Autopsy No. 49 West Surgical 64-5 Male age 34 November 3 1909 *Present illness.* Admitted with diagnosis of tumor of the bladder with cystitis. Temperature 101. *Urine.* Neutral reaction, albumin per cent, sediment much blood. Patient unable to void on account of hæmaturia placed on constant drainage. Amount of urine extremely small. Patient died without operation on the twentieth day. *Clinical diagnosis.* Tuberculosis of the prostate () uremia.

Autopsy. 11 hours post mortem. Anatomical diagnosis: Squamous cell carcinoma of bladder with bone formation in the stroma, suppurative nephritis of right kidney, occlusion of ureters in bladder wall, atrophy of right kidney with pelvic dilation, compensatory hypertrophy of left kidney, dilation of ureters.

Kidneys. Right kidney weighs 109 grams, left 263 grams. Capsules strip easily. Markings of the left kidney are retained, right kidney not clearly defined. Cortex of right kidney is narrowed, that of left is normal. The pelvis of the right kidney is dilated leaving only a small amount of kidney tissue. Scattered throughout the kidney tissue are numerous small dark red hemorrhagic areas. The left kidney shows a slightly dilated pelvis. Both ureters are markedly dilated, the right filled with blood.

Probe cannot be made to pass through the urethrovaginal orifice on either side. The bladder wall is markedly thickened especially on the right where there is a large grayish white mass extending beyond the median line and infiltrating the bladder wall.

Microscopic examination. Right kidney shows much fibroid atrophy of the tubules and glomeruli and infiltration with lymphocytes. Here and there small abscesses are present. Left kidney shows edema. Here and there a small focus of atrophy with lymphocytic infiltration is seen.

Bacteriological report. Cultures from the heart blood show no growth. *Sections stained for bacteria.* The sections preserved from this autopsy show no true abscesses but only low grade kidney changes. Large coagula are found in the glomeruli of the tubules and scattered throughout the interstitial tissue, may be post mortem invasion.

CASE 7. Autopsy No. 2364. South Surgical 79-203. Female age 1 year 10 months, M y 1909. *Present illness.* Came in for tumor of the left kidney. For past two weeks has had hematuria followed by fever. *Temperature* at entrance, 1.2.

Second day after admission to the hospital, while eating, child suddenly uttered a piercing shriek, turned cyanotic, and died. *Clinical diagnosis.* Sarcoma of kidney pulmonary embolism.

Autopsy 4 hours post mortem. Anatomical diagnosis. Adenosarcoma of the left kidney with metastasis in the abdominal lymph nodes, suppurative nephritis, pulmonary embolism.

Kidney. The left ureter when followed upward opens into an irregular yellow mass which contains considerable broken down creamy white material. Just beyond the opening of the ureter there is a small strip of tissue showing markings with pyramids and glomeruli. In one place there is a streak of yellow running through what appears to be a pyramid. This kidney tissue is continuous with and passes over into large tumor mass. The ureters and bladder are normal.

Microscopic examination. Kidney shows the tumor to consist of adenocarcinoma of the kidney. In one section in some of the renal tissue are foci of lymphoid tissue. In the right kidney there are foci of suppurative nephritis.

Bacteriological report. Culture from the heart blood shows no growth. *Sections stained for bacteria.* In three places in the kidney small arteries are found plugged with hyaline masses containing a few partly disintegrated cells and large numbers of staphylococci. In one instance there is evidence of some suppuration about the plug while the other two there is no evidence of tissue change.

CASE 8. Autopsy No. 63. South Surgical 48-148. Male age 15. November 8, 1900. *Admission diagnosis.* Septic arm. *Present illness.* Five months ago patient had felon of finger which is now healed. Two days ago without apparent cause, the right elbow became swollen and painful.

Temperature. 3. *Operation.* Incision and drainage of elbow joint. Pus showed staphylococcus pyogenes aureus. Died ninth day. *Urine examination* not recorded. *Diagnosis.* Septicemia, osteomyelitis.

Autopsy 9 1/4 hours post mortem. Anatomical diagnosis. Operation wound of right arm with osteomyelitis of the humerus, multiple abscesses of the lungs serofibrinous pericarditis, abscesses of the myocardium, abscesses of the prostate suppurative nephritis, acute degeneration of the liver acute hyperplasia of spleen, ecchymosis in the mucosa of the stomach, tuberculosis of the left epididymis and testis staphylococcus septicemia.

Kidney. At several points in each kidney just beneath the capsule are yellowish purulent foci the size of a pinhead.

Bacteriological report. Cultures from the heart blood show staphylococcus pyogenes aureus. Liver spleen, lung and pericardium show the same.

Microscopic examination. The cells of the tubules of the cortex show some swelling and granulation. There are a few small abscesses apparently originating in glomeruli. One or two of the convoluted tubules show beginning bacilli formation.

Sections stained for bacteria. show large numbers of staphylococci in the basement. Staphylococci are found in the tufts of glomeruli capsule of Bowman, tubules, and a few in the lymph spaces. Small abscesses in the lower tubules show the coagula mostly confined to the lumen of the tubule.

CASE 9. Autopsy No. 2784. East Surgical 7-20. Male age 42. January 8, 1911. *Present illness.* Uremia, hematuria, and pyuria at entrance to hospital. *Urine examination* not recorded. *Temperature* 99. *White blood count* 8,000. *Cytoscopy* showed inoperable carcinoma of the bladder. Patient died the following day. *Clinical diagnosis.* Uremia carcinoma of the bladder infected kidneys.

Autopsy 6 1/2 hours post mortem. Anatomical diagnosis. Carcinoma of the bladder pyelonephrosis suppurative nephritis pyelonephritis abscess, soft spleen.

Kidneys. Right kidney weighs 260 grams. The pyelonephritic tissue is markedly thickened and shows extensive infiltration with pus. The capsule strips with difficulty leaving an irregular surface dotted over with numerous minute yellow points which yield pus. The cortex is 5 to 8 millimeters. On section the surface shows minute collections of pus situated mainly in the cortical region. The pelvis and ureter are slightly dilated. The right ureter is somewhat occluded by a new-growth of tissue in the bladder. The left kidney weighs 93 grams. The pyelonephritic tissue is greatly thickened and shows extensive infiltration with pus. The capsule strips leaving lumpy surface dotted over with abscesses. The cortex measures 5 to 6 millimeters. Section surfaces show minute collections of pus mainly in the cortical region. In some places the tubules are dilated. The calices show yellow necrotic flakes.

The left ureter is dilated and partly occluded by new growth of bladder. The bladder mucosa is inflamed. The prostate is not enlarged. The upper part of the organ is involved in a new growth of the bladder wall which extends down onto the posterior portion of the prostate.

Microscopic examination of the kidney is not recorded.

Bacteriological report. Culture from heart blood. No growth. Sections stained for bacteria show no bacteria other than staphylococci. They are found in the lymph spaces and within the lumina of tubules, sometimes phagocytized in the epithelium of the tubules and diffusely in the abscesses. No bacilli are seen in the kidney tissue. There are a few living free in the pelvis.

CASE 10. Autopsy No. 2381. South Surgical 182-180. Male age 24. June 12, 1909. *Present illness.* Injury to right forearm eight days ago. Three days ago became delirious. Arm much swollen. *Blood cultures* showed staphylococcus pyogenes aureus cultures from arm staphylococcus aureus. *Urine examination* not recorded. *White blood count* 17,200. *Temperature* 103-108. Died second day after entrance.

Clinical diagnosis. Septicæmia, septic wound. *Autopsy* 17½ hours post mortem. Anatomical diagnosis. Septic wound of forearm, right, multiple abscess of myocardium, liver, kidneys, brain, acute splenic tumor.

Kidneys. Combined weight 312 grams. Capsules free. The surface is marked by numerous round and oval abscesses surrounded by reddish zones. The stellate veins are injected. On section cortex is of normal thickness. Both cortex and medulla show numerous fairly sharply circumscribed round spots, many of them surrounded by reddish zones. Both kidneys present practically the same picture. The bladder shows injected mucosa and dark colored areas. Pelvis and ureters are normal. *No microscopic examination or bacteriological report is recorded.* Sections stained for bacteria show large numbers of staphylococci found only within the small abscesses.

CASE 11. Surgical Case No. 12-90. South Surgical 15-30. Male age 28. December 24, 1907. *Past history.* Gonorrheal infection one year ago.

Present illness. For three weeks has had hæmaturia and pyuria with dull aching pain in the right kidney. No stricture.

Urine. acid, large trace of albumin, pus and blood. *Temperature* 100. *Operation* nephrectomy with drainage, uneventful recovery. *Clinical diagnosis.* Local suppurative nephritis.

Pathological report. Large kidney, fibrous at one end with abscess. Several small purulent foci scattered through the substance. Sections stained for bacteria showed only staphylococci present; these are found only in abscesses.

CASE 12. Autopsy No. 138. East Surgical vol. 328 p. 1. 176. Male age 62. July 9, 1890.

Diagnosis. Carcinoma pancreas. *Past history.* Eight years ago had pain in right lumbar region referred to groin and testes. *Present illness.* Admitted to the hospital for gastric symptoms. *Urine examination* on admission was negative, save for slight trace of albumin, occasional pus-cells, no cast. *Operation.* Exploratory laparotomy for carcinoma of pancreas. *Operation* continued became septic. Small abscesses developed about the holes withiliary abscesses in deep part throughout the length of the wound. *Continued* temperature after operation ranging from 100 to 104. After one month from operation patient wound gradually became lean, showing good granulations. The patient however continued to lie on ground and became progressively weaker. The temperature again rose. He developed phlebitis in right leg, apasticty in right hand and arm and swelling of left parotid region. Died on the thirty-eighth day.

Autopsy hours post mortem. Anatomical diagnosis. Carcinoma pancreas and adjacent glands involve most of the liver and glands along the abdominal aorta and iliac vessels. Abscess in tissue of the abdominal wall, acute purulent phlebitis, oedema lungs with abscesses of upper right lobe and lower left lobe, degeneration of the kidneys with subacute abscess formation.

Kidneys enlarged. Combined weight 544 grams. Cortices 5 to 6 millimeters. Capsules strip with a few adhesions. Surfaces yellowish red with thickly sown pinholes to bean sized areas, yielding on section whit semi fluid pus. These areas are more numerous in the right kidney. On section the pelvis is not remarkable. The markings are indistinct in places. Scattered through the tissue are small yellowish areas and patches mostly in or near the cortex. In the left kidney, but also showing every where in the right kidney, are yellowish streaks extending down from the cortex into the pyramids. The bladder shows nothing abnormal.

Bacteriological report. Cultures from the heart blood, liver, kidneys, pleura, spleen, and pus in the peritoneal cavity show staphylococcus pyogenes aureus. Pus from the peritoneal cavity shows in addition bacillus coli communis.

Microscopic examination shows a few scattered darkly stained areas equally distributed through the cortex and pyramids. These areas are on the average the size of a pinhead. In the pyramids they seem elongated in the direction of the tubules. On examination they are seen to consist of numerous pus-cells closely packed together in the midst of which remains of kidney structure are rather faintly indicated. Interspersed among the pus are small granulation tissue-cells. This condition would indicate that the process had lasted for some time. These areas are abscesses in the process of healing. Considerable granular detritus and colorless ring like bodies lie in the lumen of the tubules. No emboli are made out.

Sections stained for bacteria. Right kidney shows in one corner of the section several small abscesses.

two or three times the size of a glomerulus, all of which seem to take origin from glomeruli or the neighboring proximal convoluted tubules (Fig. 13). In the centers of these areas are large masses of staphylococci. There are many new connective-tissue cells. Surrounding the abscess areas there is a diffuse infiltration with new connective-tissue cells and polymuclear leucocytes. Many of the tubules leading toward the pelvis from these areas show plugs of pus and desquamated epithelial cells thickly studded with phagocytized bacteria. In the region of the distal convoluted tubules such bacterial plugs are seen to form the centers of small abscesses. Throughout the remainder of the section the tissue is for the most part unchanged. In some areas, however, there is considerable desquamation of the epithelium of the tubuli contorti. In all such portions of the sections the blood vessels are seen to contain large numbers of staphylococci, most of which are within the leucocytes (Fig. 14). In several areas the capillary entering the glomerulus and the tuft of the glomerulus contain large numbers of staphylococci (Fig. 15). In the glomeruli the staphylococci are seen lying in the capillaries and also free in the capsule of Bowman (Fig. 16). In none of these glomeruli was there any extravasation of blood into the capsule indicating a rupture of the capillary. In one of the glomeruli, in which a fortunate plane of section shows a considerable portion of the first part of the tubule, bacteria are seen not only lying in the capsule of Bowman but entering the tubule (Fig. 17). In all portions of the convoluted tubules considerable numbers of bacteria are seen in the tubules but mostly contained within the epithelial cells (Figs. 18 and 9). In the straight collecting tubules bacteria seem always to lie in the lumina of tubules. In the pelvis staphylococci and bacilli are found. The pelvic mucosa looks normal. Some few bacteria are to be found in the interstitial tissue, most of them lying in the lymph spaces.

NOTE.—This kidney seems to indicate that there has been a general infection. In the first there was considerable abscess formation resulting, which had begun to heal. There seems in addition to have been severe septicemia, many bacteria from which are seen in the process of excretion through undamaged glomeruli.

CASE 13. Autopsy No. 3 West Medical 510-163. Male, age 69, September 20, 1898. *Present illness.* Has been sick for two weeks with dyspnea as chief complaint. *Physical exam.* Shows nothing of interest save high temperature and abscess back or neck. *White blood count* 83,000. *Urine* acid, cloudy albumin, slight trace sediment few hyaline casts, blood, leucocytes. Died fourth day. *Discharge diagnosis.* Septicemia. Abscess of neck.

Autopsy 6 hours post mortem. Anatomical diagnosis. Phlegmon right shoulder multiple abscesses lungs, suppurative nephritis with infarctions, acute hyperplasia spleen, decubitus.

Kidneys. Capsules free cortex of normal width, markings retained. Here and there in the pyramids and in the cortex are a few grey opaque pinhead sized points. In the kidney there is a large wedge-shaped area extending from the base of a pyramid upward to the capsule. The tissue is pale, and the outline is marked by a grey zone. Pelvis ureters, and bladder normal.

Microscopic examination. Micrococci seen in the abscesses. In one or two instances plugs of micrococci are found in the small vessels. Cultures from the carbuncle in the back show staphylococcus pyogenes aureus. Heart blood spleen, liver and kidney the same.

Sections stained for bacteria. One area of the small pyramidal area of suppuration apparently takes origin from a bacterial embolus in a small artery. In other instances the glomeruli are clearly the seat of abscess formation, while in still others plugs of bacteria are found in the lumina of tubules surrounding which there is a narrow area of necrosis of epithelium, outside of which is infiltration with polymorphous leucocytes. In still other areas staphylococci singly or in small groups are found in the arterioles entering glomeruli. In the glomeruli they are found within the capillaries and in the tubules, in many cases phagocytized within epithelial cells of the convoluted portion. In some instances bacteria are seen within epithelial cells in apparently normal tubules.

CASE 14. Autopsy No. 507 West Medical 76-47. Male, age 65 May 1900. *Present illness.* Eleven months painful and difficult urination brown, cloudy urine. Four months severe gastric symptoms suggestive of cancer. *Temperatures* normal entrance. *Urine* alkaline, albumin slight trace, occasional cast. No urine culture recorded.

Four days later without apparent reason patient began to have hematuria with small amount of pus, accompanied by rise of temperature to 98.5 and died the third day following.

Autopsy 8 hours post mortem.

Anatomical diagnosis. Adenocarcinoma of stomach, multiple carcinoma of small intestines, chronic nephritis, suppurative nephritis of right kidney renal and ureteral dilatation, arteriosclerosis, cholelithiasis, small fibroma of bladder wall.

Kidneys. Combined weight 200 grams. Left kidney capsule strips but is somewhat adherent. Cortex is 10 millimeters in width. Left ureter is slightly dilated along its entire course but opens freely into the bladder. The mucosa is negative. Right kidney capsule strips with some fine adhesions. The granular surface is dotted over in many places with minute yellow spots. On section the tissue is firm, cortex extremely narrowed. The yellow spots described as present on the surface project down into the kidney tissue as minute, small, reddish irregular areas. The pelvis is slightly dilated. The mucosa is smooth. The right ureter is dilated its mucosa is smooth and opens

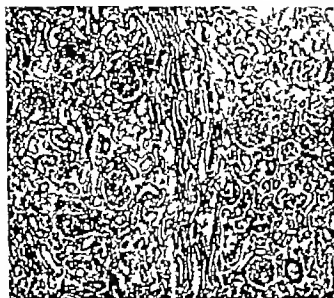


Fig. A. Typical micro-pie held from the kidney of a patient known to have had chronic pyelonephritis of bacterial origin. It ended by a marked fall in phthalin output and subsequent return to normal function. The kidney is essentially normal. Photob. L. S. Brown. 45

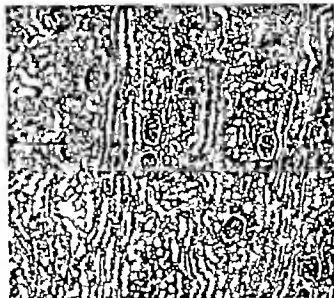


Fig. B. Typical micro-pie held from rat kidney through which parenteral bacillus albus has been passed in large numbers on three occasions. Section on hanging glomerulus at () the kidney is normal. Photob. L. S. Brown. 45

freely into the bladder. The bladder mucosa is not remarkable save that in one area there is a round minute pedunculated mass springing from the mucosa. The prostate is negative.

Microscopic examination. There is marked fibroid atrophy of the renal tissue with much arteriosclerosis, extensive suppuration and destruction of renal tissue in the surrounding areas.

Bacteriological report. Cultures from spleen show question of bacilli. Sections stained for bacteria show only staphylococci. These are found in abscesses and a few in the tubules within the protoplasm of a clump of pus-cells.

CASE 15. Autopsy No. 2008 West Medical 814-201. Male, age 64, February 7, 1912. *Past history.* Boils on the shoulder three years ago. For six years has had diabetes. *Present illness.* Sore toe of two weeks duration. Coma. *Physical examination.* Shows diabetic gangrene. Temperature normal. Urine contains much free blood and pus, slight trace of albumin, sugar, acetone and diacetic present. Patient sent to ward where he promptly died. *Clinical diagnosis.* Diabetes, acidosis, coma.

Autopsy. 9 hours post mortem. Anatomical diagnosis: Diabetes, arteriosclerosis, abscess of prostate, amyloid kidneys, gangrene of toe, soft spleen, small abscess of kidney, staphylococcus septicæmia.

Kidneys. Combined weight 540 grams. Capsules strip leaving smooth surface save in one point on the right kidney where there is a collection of fibrinopurulent material which extends into the perinephric fat. The cortices are not narrowed. In the substance of the right kidney, a short distance below the collection of pus on the surface there is a

small dark red area the central portion of which is soft. The ureters are free. The bladder shows hypertrophy of the trabeculae and the mucosa of the trigonum shows swelling and dirty redish discoloration with here and there minute yellowish soft areas. The prostate is slightly enlarged and shows numerous small areas of pus throughout the organ. They are most numerous in the middle lobe and extend up beneath the trigonum. Cover glass preparations from the prostatic pus show staphylococcus.

Microscopic examination. Kidneys show amyloid infiltration of the small arteries and glomeruli, oedema with some areas of necrosis and pus-cell infiltration. Sections of the prostate show suppuration and abscess formation.

Bacteriological report. Cultures from the heart blood show many colonies of staphylococci. Sections stained for bacteria show staphylococci alone in the small abscess cavity.

CASE 16. Autopsy No. 2262 West Medical 712-95. Female, age 45, November 30, 1908. *Past history.* Negative save for polyuria five years ago at which time diagnosis of diabetes made. *Present illness.* Patient comes in for abnormal menstruation. Urine acid, no albumin, sugar, acetone or diacetic present, moderate amount of pus. Patient put on very strict diabetic diet. Patient continued comfortable except hungry for 15 days at which time she became brown, developed a slight cough and scattered rales in the lungs and died on the seventeenth day. *Clinical diagnosis.* Diabetes, acidosis, endometritis.

Autopsy. 14 hours post mortem. Anatomical diagnosis: Glycosuria, tuberculosis of left lung.



Fig. 2. Proximal convoluted tubule of the cortex filled with desquamated epithelium and containing bacteria.

soft spleen suppurative nephritis with milky abscesses of right kidney.

Kidneys. Combined weight 385 grams. Capsules strip easily save over an area of the right kidney where there is a reddened spot 5 millimeters in diameter. This area is dotted with minute abscesses. Cover glass preparation from pus is negative for tubercle bacilli. On section the remaining tissue of the kidney is firm, markings are visible cortex is not narrowed, the pyramids are brownish red and show indefinite minute yellow areas in places. Bladder, ureters and pelvis are not remarkable.

Microscopic examination. In two sections of the kidney there are abscesses with suppurative infiltration. There is no tuberculosis.

Bacteriological report. Cultures from the heart blood and spleen show growth. Sections stained for bacteria show some hemorrhagic glomeruli in which are cocci in very small numbers. An occasional group of cocci can be found in the lumen of tubules low down toward the tips of the pyramids and a few in the pelvis. The sections preserved from this kidney show no abscesses.

CASE 17. Autopsy No. 828 East Surgical 554-275. Male, 19. November 5, 1906. Present illness: Carbuncle upper lip five days duration. Intense odema, fever. No renal tenderness or masses. Temperature 104. Urine negative (but no sediment done). Patient died third day. Clinical diagnosis: Carbuncle of lip septicaemia.

Autopsy 6 hours post mortem. Anatomical diagnosis: Carbuncle of lip, multiple abscess of the lung with empyema, suppurative infiltration of the anterior and superior mediastinum, suppurative epiphitis, acute hyperplasia of spleen, staphylococcus pyogenes aureus septicaemia.

Kid vs. Combined weight 360 grams capsules slightly adherent. There are three or four minute suppurative foci in the kidneys. The cortices are normal in width and the markings retained. The bladder and ureters are not remarkable.

Microscopic examination. There is cloudy swelling of the epithelium of the tubules.

Bacteriological report. Cultures from the heart blood and spleen show staphylococcus pyogenes aureus. Sections stained for bacteria show large clumps of staphylococci within the abscesses, none in any other part of the section.

CASE 18. Autopsy No. 20 South Surgical 9055. Female, age 43, March 16, 1904. Present illness: Recent pneumonia followed by empyema with symptoms of brain abscess of two weeks duration. Urine examination negative thirteen days later slight trace of albumin, small amount of blood and pus. Operation: Exploration of old empyema. Following operation patient became unconscious and general paralysis developed. Patient died thirty-third day. Clinical diagnosis: Empyema, brain abscess.

Autopsy. Anatomical diagnosis: Abscess of brain, chronic empyema left with sinus communicating with the pleural flexure of the colon, subdiaphragmatic abscess, ulcer of stomach with secondary carcinoma, abscess of kidney operation wound.

Kidneys. The kidneys are of normal size capsule stripped. At one point in the surface of one of the kidneys is a small abscess which extends a short distance into the kidney tissue. The bladder and ureters show nothing abnormal.

Microscopic examination. Kidney sections show rather extensive degeneration of the renal elements.

Bacteriological report. Cover glass preparations from the pus of the brain abscess show leucocytes,



Fig. 3. Microphotograph of area of complete transverse lesion (—) base of pyramid. Below is shown necrotic pyramid. b—b Congested blood-vessels.

staphylococci streptococci and bacilli. Cultures from the heart blood show no growth liver shows many colonies of colon like bacilli and a few streptococci spleen shows slight growth of colon like bacilli. Sections stained for bacteria show clumps of staphylococci in abscesses none found in the tubules or pelvis.

CASE 19. Autopsy No 1093 West Surgical 441-45. Female age 3 June 1 1904. Past history negative as to genito-urinary tract. Present illness: Five years ago gall stone symptoms urine examination on admission negative. Operation: cholecystectomy with drainage of common duct. Slight sepsis of wound occurred. During convalescence swelling of right parotid gland which was later incised. Patient died on the thirty fourth day. Clinical diagnosis: Gall stones and pyæmia.

Autopsy 14 hours post mortem. Anatomical diagnosis: Cholecystectomy with open bile-duct subcutaneous abscess of the walls of the wound phlegmon of neck abscesses of kidneys septicæmia staphylococcus pyogenes aureus.

Kidneys. Weight is not mentioned capsules strip easily. In two or three places in each kidney the surface shows several small abscesses which extend a short distance into the kidney substance. Cover glass preparations from the pus of these abscesses show leucocytes and staphylococci. Ureters and bladder show nothing worthy of note.

Microscopic examination. Sections from the kidneys show abscesses.

Bacteriological report. Cultures from the heart liver spleen skin abscesses and kidney abscesses show growth of staphylococcus pyogenes aureus. Sections stained for bacteria. Abscess cavities show large clumps of staphylococci no other bacteria.

CASE 20. Autopsy No 1039 West Medical 384-40. Male age 38 March 15 1902. Present illness: Seven weeks ago began to feel poorly slight gastric symptoms restlessness at night. Two weeks later gave up work. Still later he began to develop pain and local areas of soreness in the left arm. Temperature at entrance 100 and continued as a high septic temperature. Physical examination: Large abscess of right shoulder another over sacrum. On back and extremities numerous small semi-furrow abscesses. Pus from abscesses showed staphylococcus pyogenes aureus. White blood count 26,000. Urine acid albumin slightest possible trace sediment rare casts but some with pus-cells adherent few pus-cells much epithelium. Patient continued with high fever until death on the fifth day. Clinical diagnosis: Pyæmia, multiple abscesses.

Autopsy 39 1/2 hours post mortem. Anatomical diagnosis: Multiple abscesses of the liver thrombosis of hepatic vein multiple abscesses of lungs kidneys and subcutaneous tissue of extremities and trunk hyperplasia of spleen purulent otitis media, septicæmia staphylococcus pyogenes aureus.

Kidneys. Combined weight 416 grams. Capsules free. Scattered throughout the substance of



Fig. 4. Drawing through area of kidney including cortex zone of suppuration and parts of renal papilla. Labels: a renal cortical tubules b congested area of transverse suppuration c lesion (purplish area of Fig. 1) marked by c empty blood vessels of anemic papilla.

each kidney are several small abscesses containing pus. Some of these are arranged in more or less confluent groups. Cortices of normal width with markings retained. Bladder prostate and ureters normal.

Microscopic examination. Aside from the abscesses, the renal tissue is not remarkable.

Bacteriological report. Cultures from the heart liver and spleen abscesses of the right kidney hip and left ankle show profuse growth of staphylococcus pyogenes aureus. Cover glass preparations from these abscesses show staphylococci but no other bacteria. Sections stained for bacteria. Abscess cavities contain clumps of staphylococci no other organisms.



Fig. 5 Microphotograph of necrotic renal papilla showing necrosis of interstitial tissue and epithelium of the tubules with fragmentation of nuclei and loss of cell outline. The lumen of one tubule is filled with large clumps of bacteria (almost entirely colon bacilli). Empty blood vessels seen (x400). Bacteria treated with 40 per cent formalin to cause them to retain the gram stain for photomicrographic purposes. Phot. by L. S. Brown, 500.

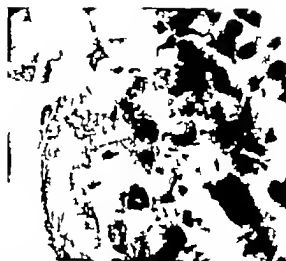


Fig. 6 Microphotograph showing destruction of a tubule by bacteria contained within its lumen. Remnant of tubule seen to the left. Bacteria are chiefly streptococci. Phot. by L. S. Brown, 500.

CASE 21: Autopsy No. 986 East Medical 573, 138 Female, age 5, December 2, 1900. *Past history* negative. *Present illness* Eight days ago symptoms of acute infection with vomiting, loss of appetite, shortness of breath and urinary incontinence. *Physical examination* Considerable fluid in abdomen, evidence of fluid in both chests. Question of tumor mass in abdomen. Temperature normal and remained so. White blood count 62,000. *Urine* acid, slight trace of albumin, moderate amount of pus. Abdominal fluid, exudate cells polymorphonuclear leucocytes. A few cocci in abdominal fluid. Patient died suddenly, third day. *Diagnosis* Ovaria cyst, septicemia and pyrexia.

Autopsy 6 hours post mortem. Anatomical diagnosis: Cystomata of the ovaries with suppuration and gangrene, compression and dilatation of the right ureter, suppurative nephritis of the right kidney.

Kidneys Left kidney somewhat larger than right. Capsule strips. Cortex narrow markings retained. On the surface of the right kidney are number of whitish slightly elevated areas which on section show purulent material. These areas are not sharply outlined from the surrounding renal tissue and show some tendency to extend in the form of streaks into the cortex.

Microscopic examination On section kidney shows an area of infected renal tissue infiltrated with polymorphous leucocytes. The renal tubules appear to be disintegrated.

Bacterial cultural report Cultures from the heart and spleen no growth from liver two colonies of bacillus coli communis. Peritoneal exudate also a

bacillus coli communis bacillus aerogenus capsulatus and staphylococci. Section stained for bacteria also few staphylococci. One of the tubules. There are bacteria in the section preserved.

CASE 22: Autopsy No. 83 South Surgical 60-64, Male age 3, January 6, 1902.

Past history Gonorrhea twice. *Present illness* Appendix symptoms three weeks duration with abscess at time of entrance to hospital. On entrance bowels slight trace of albumin sediment showed pus and very many casts, some with pus cells adherent. Septic temperature ranging from 100 to 104. White blood count 43,000. Free pus in the abdomen, culture from which showed staphylococcus pyogenes aureus. Patient died on the nineteenth day after admission. *Clinical diagnosis* Appendix abscess, septicemia.

Autopsy 34 hours post mortem. Anatomical diagnosis: Gangrenous appendicitis with abscess formation with perforation and gangrene of caecum, suppurative phlebitis ilioecolic and superior mesenteric veins, suppurative thrombophlebitis portal vein, multiple abscesses liver, abscesses right kidney, laparotomy wound, cut hyperplasia spleen, streptococcus septicemia.

Kidneys Combined eight 203 grams capsules strip. Cortical measurements 6 millimeters. The pyramids are dark reddish in color. The substance of the right kidney in the pyramidal portion discloses on section a small collection of pus. No areas of suppuration found in the left kidney. Ureters, bladder, prostate seminal vesicles, and testes are otherwise normal.

Microscopic examination A fairly large section of the kidney fails to show any lesion worthy of mention.



Fig. 1. Low magnification view of the slide showing the bacteria. The bacteria are small, dark, rod-shaped, and arranged in chains and clusters. The background is light and granular.

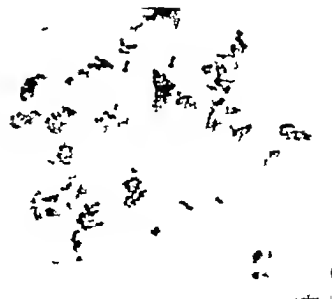


Fig. 2. High magnification view of the slide showing the bacteria. The bacteria are small, dark, rod-shaped, and arranged in chains and clusters. The background is light and granular.

Case 22. Autopsy No. 1463. East Surgical 1903. Male age 64. April 6, 1903. *Present illness.* Recent penetration of ankle and fracture of ribs. *On first examination* negative. *Second examination* two weeks later. albumin small trace. edema much pus. Admission temperature 101. rose to 103-104 maintained until death on twenty-fourth day. *Streptococci* in wound. *Clinical diagnosis.* Compound fracture of ankle streptococcus wound streptococcus septicemia.

Autopsy 15 hours post mortem. Anatomical diagnosis. Compound comminuted fracture of right ankle fracture of ribs purulent inflammation of deep tissues of the right leg slight suppurative nephritis streptococcus septicemia.

Kidney. Capsules strip revealing numerous small cortical cysts. The markings are obscured. The ureters are free. The bladder and prostate are not remarkable.

Miscellaneous examination. A small papillary adenoma of the kidney is present also occasional areas of atrophic atrophy with cyst formation. In two or three places are small suppurative areas.

Bacteriological report. Cultures from the heart blood and spleen show streptococcus pyogenes. Cultures from the liver show a few streptococci and many colon bacilli. *Sections stained by bacter.* A few chains of streptococci are found in the blood vessels of the kidney and in the areas of suppuration.

Case 23. Autopsy No. 984. West Medical 84-86. Female age 44. February 23, 1901.

Present illness. Recent penetration of ankle and fracture of ribs. *On first examination* negative. *Second examination* two weeks later. albumin small trace. edema much pus. Admission temperature 101. rose to 103-104 maintained until death on twenty-fourth day. *Streptococci* in wound. *Clinical diagnosis.* Compound fracture of ankle streptococcus wound streptococcus septicemia.

Autopsy 15 hours post mortem. Anatomical diagnosis. Compound comminuted fracture of right ankle fracture of ribs purulent inflammation of deep tissues of the right leg slight suppurative nephritis streptococcus septicemia.

Kidney. Capsules strip revealing numerous small cortical cysts. The markings are obscured. The ureters are free. The bladder and prostate are not remarkable.

Miscellaneous examination. A small papillary adenoma of the kidney is present also occasional areas of atrophic atrophy with cyst formation. In two or three places are small suppurative areas.

Bacteriological report. Cultures from the heart blood and spleen show streptococcus pyogenes. Cultures from the liver show a few streptococci and many colon bacilli. *Sections stained by bacter.* A few chains of streptococci are found in the blood vessels of the kidney and in the areas of suppuration.

Case 24. Autopsy No. 984. West Medical 84-86. Female age 44. February 23, 1901.

Present illness. Recent penetration of ankle and fracture of ribs. *On first examination* negative. *Second examination* two weeks later. albumin small trace. edema much pus. Admission temperature 101. rose to 103-104 maintained until death on twenty-fourth day. *Streptococci* in wound. *Clinical diagnosis.* Compound fracture of ankle streptococcus wound streptococcus septicemia.

Autopsy 15 hours post mortem. Anatomical diagnosis. Compound comminuted fracture of right ankle fracture of ribs purulent inflammation of deep tissues of the right leg slight suppurative nephritis streptococcus septicemia.

Kidney. Capsules strip revealing numerous small cortical cysts. The markings are obscured. The ureters are free. The bladder and prostate are not remarkable.

Miscellaneous examination. A small papillary adenoma of the kidney is present also occasional areas of atrophic atrophy with cyst formation. In two or three places are small suppurative areas.

Bacteriological report. Cultures from the heart blood and spleen show streptococcus pyogenes. Cultures from the liver show a few streptococci and many colon bacilli. *Sections stained by bacter.* A few chains of streptococci are found in the blood vessels of the kidney and in the areas of suppuration.



Fig. 9. Upper edge of small cortical abscess—1 millimeter below the capsule. Infecting agent pure staphylococcus albus. Note that tubules above the abscess contain no pus. There is extensive infiltration of the interstitial tissue extending from the abscess to the cortex. Neighboring tissue is normal. Phot. by L. S. Brown, 40.

Past history. Long standing anemia. **Present illness.** Still continues weak with a variety of symptoms chiefly of dyspnea and gastro-intestinal upset. **Physical examination.** Shows anemia and cardiac lesions. **Urine** at entrance negative save for unexplained small trace of albumin. **Temperature** continued as it had been before—slight evening increase to 99-100. Was given 6 gram 606 intramuscularly in left gluteal region, followed by vomiting and soreness in the buttocks and in duration with some increase of temperature. Twenty days later still some induration about site

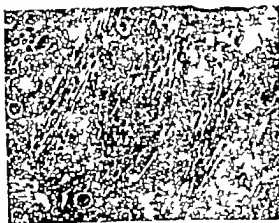


Fig. 10. Small abscess found immediately below the abscess shown in Figs. 9 and 11 in column of Bertini. Note fine of tubules filled with pus cells and found to contain bacteria extending upward to connect with similar tubules shown in Fig. 9. The abscess shown here is situated in the bend of the loops of Henle. Photo by L. S. Brown, 40.



Fig. 11. Lower edge of abscess shown in Fig. 9. Note fine of tubules filled with pus—tending down into the kidney. There is some pus-cell infiltration of the interstitial tissue. Phot. by L. S. Brown, 40.

of pectus excavatum. One month after entrance to hospital urine began to show blood and pus in small amounts. Lungs show signs of edema. Condition thought to be arsenic poisoning and excision of reservoir of 606 done. Wound discharged freely and sloughed. Patient died at the end of four months. *Culture of pus.* Perforated gastric arsenic poisoning reaction.



Fig. 12. A third abscess underlying the tubules shown in Figs. 9, 10, and 11 situated in the straight tubules of the tip of the papilla. There here in the tubules of this pyramid tip are to be found small masses of staphylococci some with threads beginning bacteria formation. Phot. by L. S. Brown, 40.



Fig. 4. On a small tuft of cortical abscesses all of which seem to take origin from glomeruli. Phot. by L. S. Brown. 500.

Autopsy. 15 hours post mortem. Anatomical diagnosis: Arteriosclerosis nephritis with foci of suppuration, septicaemia streptococcus.

Kidneys. Right kidney weighs 116 grams. capsule adherent. The configuration of the organ is distorted by the presence of two large depressed areas corresponding to areas of extensive atrophy of the renal tissue. About one quarter of the volume of the kidney is involved in this area. The renal tissue outside of this area shows obscure markings, and the line of demarcation between cortex and pyramids cannot be made out. There is distortion of the pelvis due to area of atrophy. The left kidney weighs 51 grams. Its capsule is ex-

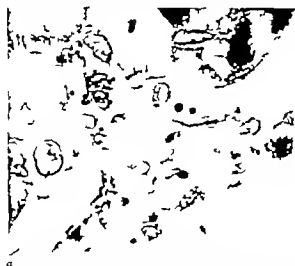


Fig. 5. Section through glomerulus at the point of entry of the capillary into the glomerulus to form the tuft. Portion of the capsule of Bowman is seen at —. Not large number of cocci entering the glomerulus in the blood stream. Phot. by L. S. Brown. 1500.



Fig. 14. Microphotograph showing thickening of the renal portion of the kidney. Phot. by L. S. Brown. 1500.

tremely adherent and thickened. Marking of the cortex cannot be made out and the line of demarcation between the cortex and kidneys is not clear. At one point the renal tissue over an area of 1 centimeter is extremely tough and fibrous in character. The pelvis, ureter and bladder are not remarkable.

Microscopic examination. Section from the non-atrophic portion of the kidneys shows large tubules and glomeruli. The failure to observe the usual cortical markings at autopsy was probably due to improper incising owing to obscuration of the parts. A second section shows a zone of extreme atrophy extending along beneath the capsule. There is ex-



Fig. 6. Edge of glomerulus showing phagocytosis in the lumen of the capillary and also free in the capsule of Bowman. There is no evidence of rupture of the capillary in this glomerulus. Phot. by L. S. Brown. 500.



Fig. 7 Microphotograph showing origin (first portion) of tubule. The glomerulus lies above and to the left. At this point to be seen streptococci in diplococcus form entering the first portion of the tubule. The remaining particles are refracts due to precipitated gram-stain. Photo by L. S. Brown, 500.

trreme sclerosis of the vessels in this area. At this point there is an area of suppuration in the cortical region. In the left kidney there are several areas of suppuration in the tissue.

Bacteriological report. Cultures from the heart blood show moderate growth of streptococci. Sections stained for bacteria show streptococci only. They are located in the tufts of the glomeruli and occasionally in the lymph-spaces. Glomeruli containing streptococci show mild glomerular changes.

CASE 26. Autopsy No. 544. Neurological. 1-10. Male, age 30. February 20, 1900. **Past history.** Two years ago right leg torn and crushed in an accident; an abscess formed which was later opened. **Present illness.** For past six weeks numbness of both feet which gradually extended upward involving the body from the lower half of the abdomen down. Diagnosis of myelitis. **Course.** At time of entrance, heavy, alkaline, slight trace of albumin and a few pus-cells. **Temperatures.** normal and remained so during the first thirty days of patient stay in the hospital at which time he developed bed sores, erysipelas, and septic foot. Died forty-second day. **Clinical diagnosis.** Myelitis, cystitis, erysipelas, bed sores, septic foot.



Fig. 8 A section of the proximal constricted tubule showing a tract of streptococci in the upper left hand portion of the tubule and a lump of cocci at the opposite side. Note the presence of these cocci in the protoplasm of epithelial cells. Photo by L. S. Brown, 500.

CASE 27. 5 hours post mortem. Anatomical diagnosis: Erysipelas, decubitus, hypertrophic bladder, and ureters, cystitis, ureteritis, pyonephrosis, early suppurative nephritis, chronic pericarditis, ulcer of right foot, embolized tract degeneration of the spinal cord, streptococcus septicemia.

Kidneys. Normal size, the papulae are slightly adherent. The surfaces are smooth and show few small depressions, some of which are pale in color. All kidneys are retained. Cortex is somewhat narrowed. The pelvis and calices are dilated and the papillae are slightly flattened. Pelvic mucosa is reddened. The ureters are markedly dilated and their walls thickened. The mucosa shows an injection. The bladder is thick and red.

Microscopic. In all the renal tissue is infiltrated with plasma cells, lymphocytes and leucocytes, and the renal tissue is disintegrated. The leucocytes are generally in the minority which may be regarded as indicating a beginning suppuration.

Bacteriological report. Cultures from the heart blood show a growth of streptococci. Sections stained for bacteria show few streptococci in the blood vessels and one or two of the glomeruli. The section preserved from the autopsy contained no abscesses.

CASE 27. Autopsy No. East Medical 6074. Female, age 5. April 20, 1904. **Present illness.** Three months ago for no apparent reason left leg became swollen and has remained so. Has had considerable abdominal and gastric distress with vomiting. Irregular septic temperature normal to 100 with premonitory rise. **Urine.** acid, albumin, slight trace, numerous epithelial cells, leucocytes,



Fig. 1. Pyogenic abscess in the kidney. The mass is surrounded by a thick, eosinophilic capsule. The mass is filled with numerous small, dark, granular particles, likely bacteria or debris. The surrounding tissue is highly cellular and inflamed.

in the left kidney. The left kidney was found to be normal. The right kidney was found to be enlarged and contained a large, pale, amorphous mass (pyogenic abscess) surrounded by a thick, eosinophilic capsule. The mass was filled with numerous small, dark, granular particles, likely bacteria or debris. The surrounding tissue was highly cellular and inflamed.

Autopsy.—A 48-year-old male. Autopsy performed 48 hours post mortem. Anatomical diagnosis: Syphilis of the aorta and kidneys. Both kidneys enlarged and contained a large, pale, amorphous mass (pyogenic abscess) surrounded by a thick, eosinophilic capsule. The mass was filled with numerous small, dark, granular particles, likely bacteria or debris. The surrounding tissue was highly cellular and inflamed.

Kidneys.—Right kidney weighs 145 grams. Left kidney weighs 140 grams. Both kidneys enlarged and contained a large, pale, amorphous mass (pyogenic abscess) surrounded by a thick, eosinophilic capsule. The mass was filled with numerous small, dark, granular particles, likely bacteria or debris. The surrounding tissue was highly cellular and inflamed.

Autopsy examination.—Kidneys show rather diffuse increase of interstitial connective tissue most marked in the left. In the right kidney there is a large, pale, amorphous mass (pyogenic abscess) surrounded by a thick, eosinophilic capsule. The mass was filled with numerous small, dark, granular particles, likely bacteria or debris. The surrounding tissue was highly cellular and inflamed.

Bacterial cultures.—Cultures from the heart blood and pleural space show profuse growth of streptococci.



Fig. 2. Pyogenic abscess in the kidney. The mass is surrounded by a thick, eosinophilic capsule. The mass is filled with numerous small, dark, granular particles, likely bacteria or debris. The surrounding tissue is highly cellular and inflamed.

in the right kidney. The right kidney was found to be enlarged and contained a large, pale, amorphous mass (pyogenic abscess) surrounded by a thick, eosinophilic capsule. The mass was filled with numerous small, dark, granular particles, likely bacteria or debris. The surrounding tissue was highly cellular and inflamed.

Clinical history.—The patient had a long history of syphilis, with aortic aneurysm and aortic regurgitation. He had been treated with mercury and arsenic. He had been ill for several weeks before death, with fever, chills, and weakness.

Autopsy.—A 48-year-old male. Autopsy performed 48 hours post mortem. Anatomical diagnosis: Syphilis of the aorta and kidneys. Both kidneys enlarged and contained a large, pale, amorphous mass (pyogenic abscess) surrounded by a thick, eosinophilic capsule. The mass was filled with numerous small, dark, granular particles, likely bacteria or debris. The surrounding tissue was highly cellular and inflamed.

Kidneys.—Right kidney weighs 140 grams. Left kidney weighs 145 grams. Both kidneys enlarged and contained a large, pale, amorphous mass (pyogenic abscess) surrounded by a thick, eosinophilic capsule. The mass was filled with numerous small, dark, granular particles, likely bacteria or debris. The surrounding tissue was highly cellular and inflamed.



Fig. Typical area from the kidney of child with chronic pyelonephritis which now presents the picture of pure pyelitis. The kidney tissue is normal throughout. Photo by L. S. Brown, 45.

seen to be the basal surface of small pyramidal masses extending into the tissue for a short distance and are marked off from the rest of the kidney substance by narrow, pale red margins. The largest infarct measures 5 millimeters at the base. The markings are retained and the cortex is not narrowed. The pelvis and ureter are negative; the bladder and prostate are negative.

Microscopic examination. The kidney shows acute degenerative changes in the epithelium in each of two sections, small infarcted areas.

Bacteriological report. Cultures from the spleen show no growth. *Sections stained for bacteria.* In the cortical region is situated a small pyramidal area with the base at the periphery and the tip extending down into the cortical substance to a point between the bases of the two pyramids. The center of this area shows homogeneous acutely degenerated kidney substance without cell infiltration. In the region of the capsule the blood vessels are tremendously engorged with some polymorphonuclear infiltration. This area of engorgement forms a border about one millimeter in thickness over the surface of the infarct. At the tip of the infarcted area two small arteries are found plugged with thrombi containing few organisms of the pneumococcus streptococcus group (Fig. 20). The periphery of the infarcted area consists of engorged blood vessels with rupture of some of these vessels and liberation of red cells into the tissue and moderate infiltration with polymorphonuclear leucocytes. No bacteria are found in any portion of normal kidney tissue or infarcted area except within the two arteries plugged with thrombi already mentioned.

The lesions above described are shown in these cases as follows: perinephritic abscess



Fig. Microphotograph of portion of pelvis (same case as Fig. 1) showing slight thickening mucosa without submucosa change and large numbers of colon bacilli growing in the mucosa. Photo by L. S. Brown, 500.

was demonstrated in Cases 4 and 9; capsular abscess and capsulitis appear in cases 6 and 9; cortical abscesses appear in cases 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, and 27. Septic infarct was demonstrated in Cases 10, 13, 21, 17, and 18, while diffuse suppuration appears in Cases 4, 7, 21, and 26.

THE LESIONS PRODUCED BY THE COLON TYPHOID GROUP OF BACTERIA

The lesions characteristic of this group of organisms are acute pyelitis, acute pyelonephritis, chronic pyelonephritis, and pyonephrosis. As evidence of this we submit Cases 29 to 33.

CASE 29. Autopsy No. 3503. Children's Medical vol. 33, p. 75. Female, age 13 months. September 6, 1905. *Present illness.* For one week before entrance child began to look sick but continued to eat well for past two days has been feverish. *Physical examination.* Negative. Since entering the hospital temperature has continued irregular and high, varying from 100 to 103 with a premortem rise to 107. Child unable to take food except in ounce amounts. Continued to lose strength and died thirteenth day. *Urine* at entrance showed small trace of albumin, many pus-cells and at four subsequent examinations findings continued the same. *Examination of stool* negative. *Culture of urine* bacillus coli. *Clinical diagnosis.* Pyelonephritis. Toxic absorption. Heat prostration.



Fig. 3. Typical appearance of the kidney in chronic pyelonephritis. The result of a long and extensive damage to the tubules and glomeruli. Phot. b. L. S. B. 45

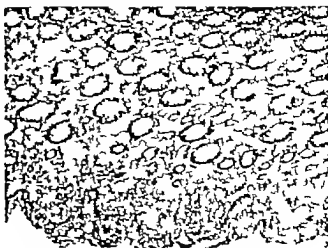


Fig. 4. P4. Typical appearance of the kidney in chronic pyelonephritis. The result of a long and extensive damage to the tubules and glomeruli. Phot. b. L. S. B. 45

Intestine. Four hours post-mortem. Anatomical diagnosis: Bronchitis, emaciation, fatty metamorphosis of the liver, light infective focus in the colon.

Kidney. Combined weight 26 grams. Capsules stripped, leaving pale, moist surface. On section the tissue is of good consistency. Markings are made out and cortex measures 2 millimeters. In the pelvis of the kidney there are three or four minute, whitish, nodules. The rest is otherwise negative.

Bacterial culture. Culture from the heart at autopsy shows no growth.

Microscopic examination of the kidney. Some acute degeneration of the tubules, no glomerular change (Fig. 21). *Stain is stained for bacteria* with light pink and polychrome anilinization of the mucosa of the papilli and calices throughout the section with large number of bacilli scattered throughout the mucosa among the cells (Fig. 22). The glomeruli, tubules and interstitial tissue show no bacteria. There are no bacteria in the blood vessels or lymphatics. In one portion of the section a portion of a pyramid lying in contact with a recess of a calyx shows a clear area extending 2 to 3 millimeters into the tissue, a few isolated bacilli unattended by pathological change lying in the lymphatics of the interstitial tissue.

Case 30. Female, age 1, private patient of Dr. Hugh Cabot, January 15, 1905. **Diagnosis:** Infantile pyelonephritis. **Past history:** Since infancy has had more or less pyuria, the amount of pus in the urine having increased considerably during the last four years. During the past year or so years has had prolonged course of treatment with autogenus

vacines. The urine has always contained large amount of pus, albumin and macroorganisms which have been variously labeled as *Lactobacilli* and proteus by different observers.

Case 31. Shows some diffuseness of the bladder. Right ureteral orifice normal. Urine from the right ureter clear and lean. The left ureteral



Fig. 5. Section of ureter from case shown in Fig. 3 and 4, showing thickened mucosa and submucosa. The collecting cells in the submucosa. There are few pus cells in the submucosa. Bacteria along with pus cells are found in the mucosa. Phot. b. L. S. B. 45



Fig. 26. Typical picture of pyelonephritis due to the colon bacillus (in case in which the conditions requisite for ascending infection were present). Note normal glomeruli, dilated tubules filled with pus and desquamated epithelium and moderate interstitial infiltration with lymphocytes and few pus-cells. Phot. by L. S. Brown, 45x.

orifice is edematous and the urine from the left ureter is very dilute slightly turbid and flows freely. Phenolsulphonephthalein functional test. Intramuscular injection right kidney—appearance time, six minutes, amount in one hour 20 per cent left, 15 minutes, one hour amount 3-4 per cent. The capacity of the left pelvis is 50 cubic centimeters plus. Infected radiograph shows a very large dilated pelvis and ureter with widely dilated calices.



Fig. 28. Same case as shown in Figs. 26 and 27. Colon bacilli in the blood stream of the kidney. Phot. by L. S. Brown, 500x.

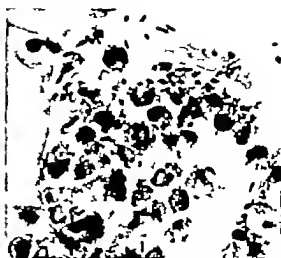


Fig. 29. Microphotograph of one of the dilated tubules filled with pus and desquamated epithelial cells. Note that the tubule is definitely the center of bacterial activity and pus production. A few bacilli are seen breaking through the tubules into neighboring tissue. They are unattended by pathological change. Bacilli treated with formalin. Phot. by L. S. Brown, 500x.

Right—as above only a few red blood-cells (traumatic) stained sediment box no bacteria. Left—shows albumin very slight trace sediment much pus many irregular sized motile bacilli considerable renal epithelium. Stained sediment shows on type of organism present gram negative bacillus. Cultures right—no growth left urine shows profuse growth of gram negative bacillus cultural characteristics and agglutination on test localizing it as bacillus coli communis. Oper. 11. Left nephrectomy with removal of ureter to the base of the pelvis. Rapid and eventful recovery.

Pathological report. The specimen consists of kidney and fragment of ureter—centimeters long. The kidney is slightly enlarged. The circumference of the ureter varies from 3 to 4 centimeters. The left kidney shows extensively dilated calices with very little kidney substance remaining. The kidney cortex measures from 1 to 4 millimeters in thickness. The kidney tissue remaining is rather pale mahogany color, is made out and the capsule strips easily in a few places. The pelvic mucosa is markedly thickened and has finely granular non-reflecting surface. The ureter shows the same thickening of mucosa as the pelvis. The infiltrative process in many places extends through the muscularis and is marked about the blood-vessels.

Microscopic section. shows somewhat thickened capsule. The glomeruli for the most part are undamaged. In other areas few show smooth hyaline appearance. There is some round-cell infiltration of the interstitial tissue generally distributed over the section. A portion of the con-



Fig. 6. Microphotograph of another typical pyelonephritic unit, that shown in Fig. 5, and shows that in this case there was no previous tubular dilatation. Addition of blood or red staining. An ascending infection would be impossible in this case. Phot. by L. S. Brown, X 45.

luted tubules show hyaline degeneration (Fig. 23). In a few of these the epithelium is desquamated and is found in the lumen of the tubules lower down. The lumina of the tubules are generally dilated particularly in the pyramids in which area there is also considerable interstitial thickening. The mucosa of the pelvis is much thickened and infiltrated with pus-cells (Fig. 24). Just beneath the pelvic mucosa is infiltration with round cells and a few polymuclear leucocytes extending into the pyramids for a distance of one centimeter. Sections of the ureter wall show some infiltration of the muscularis with some areas of polymuclear cells in the perireteral tissue. The mucous membrane is much thickened and infiltrated with pus-cells. The submucosa shows dense lymphocytic infiltration (Fig. 25) with a few pus-cells.

Sections stained for bacteria show no bacteria throughout the greater portion of the kidney. The area of submucosa infiltration in the pelvis, tips of pyramids and the ureter show a few scattered bacilli. The pelvic and ureteral mucosa and masses of debris within the pelvis and ureter show large numbers of colon bacilli. The groups of desquamated epithelial and pus-cells previously described in the lumina of the convoluted tubules show no bacilli. In some few areas single bacilli were found in the lymphatics of the interstitial tissue of the pyramids.

CASE 31. Autopsy No. 2035. West Medical 68 to 70. Male age 56. September 1, 1900. Present illness. Since childhood has had a complex group of symptoms, but none of a urinary nature, chiefly of gastric disturbance. The diagnosis of

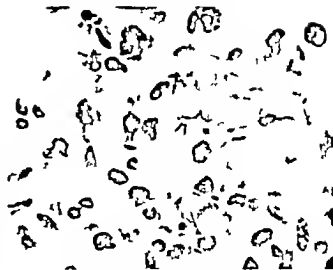


Fig. 30. Destruction of tubules, colon bacilli. Same case. Fig. 29. Phot. by L. S. Brown, X 500.

hypertrophy and gastric neuritis has been frequently made at several Boston hospitals. Temperature at entrance normal. Urine negative. White blood count 6500. Patient remained in the hospital for 6 days, then she developed a temperature, symptoms of bronchopneumonia and died ten days later. Urine examination one week before death showed acid reaction, very slight trace of albumin, moderate number of pus-cells without casts. Clinical diagnosis: Hysteria, bronchopneumonia.

Autopsy 7 hours post mortem. Anatomical diagnosis: Extensive bronchopneumonia, suppurative nephritis, acute degeneration of the myocardium, soft spleen, fatty liver.

Kidneys. Combined weight 245 grams. In one kidney there are numerous large and small dark red blotches in the cortex. On section these blotches correspond to red bands and streaks of varying width extending from the cortex into the pyramids. The pelvis are not dilated, the ureters are negative.

Macroscopic examination of the kidneys shows supuration.

Bacteriological report. Cultures from the heart blood show a few colonies of bacilli. Sections stained for bacteria show an extensive suppurative nephritis of the pyelonephritic type. Bacilli are found only in the convoluted and collecting tubules and the pelvis. There are no cocci.

CASE 32. Autopsy No. 858. South Surgical vol. 61, p. 65. Male age 56. March 21, 1900. Diagnosis: Cancer stomach and liver. Past history negative as regards kidney symptoms. For 2 years loss of weight and strength associated with severe gastric symptoms. Physical examination shows tumor mass in epigastrium. Negative kidney examination and negative urine. Although no sediment was done. Operation. Exploratory laparotomy for adenocarcinoma of stomach and secondary carcinoma of liver with drainage of wound.



Fig. 5. Mixed colon bacillus and staphylococcus infection in kidney removed at operation. Cultures taken at operation were reported bacillus coli alone. Pathological examination shows multiple abscess formation. Error in diagnosis of the nature of the infection from dependence upon culture was due to overgrowth of staphylococci by the colon bacillus. Photo by L. S. Brown 500

Patient had to be etherized permanently from operation until death. Temperature remained subnormal throughout illness. Patient extremely weak and losing ground constantly. Wound showed a constant discharge of chylous fluid with some suppuration. Patient died quietly on twenty second day.

Autopsy 15 hours post-mortem. Anatomical diagnosis: Adenocarcinoma pancreas with metastases in the mesentery lesser and greater omentum walls of the intestine at stomach, peritoneum, liver and the left adrenal; ascites, fibrinous peritonitis, chronic adhesive pericarditis, arteriosclerosis of vessels of Willis, suppurative nephritis, slight dilatation of the pelvis of the right kidney, slight chronic interstitial nephritis, right kidney. Laparotomy wound healed, fracture left humerus.

Kidneys: Combined weight 300 grams. Left kidney capsule strips leaving smooth surface mottled in places with pinhead sized yellowish areas distinct and in small groups. In one place these areas show red mottling. On section they extend over a short distance into the cortical tubules. The markings are retained. The tissue of the upper portion of the pyramids and cortex shows some red marking and pinhead sized yellow and red areas. Pelvis and ureter of normal. Right kidney capsule strips leaving a smooth surface. On section the kidney tissue is firm the markings retained, and the section surface generally is pink colored. There is some slight dilatation of the ureter and pelvis. On section the mucosa of the ureter is not remarkable and entrance of ureter into bladder is free. The portion of the ureter which runs through the bladder wall is the smallest in caliber. Bladder not remarkable.

Microscopic examination: The sections show abscesses in small cortical tubules (Fig. 26). There is cloudy swelling of many of the convoluted tubules. There is also some arteriosclerosis. In other portions of the kidneys there is increase in the interstitial connective tissue with atrophy of many of the convoluted tubules and fibrous thickening of some of the glomerular capsules.

Bacteriological report: Cultures from heart blood no growth. Cultures from liver bacilli of the colon group, cultures from the spleen, few colonies of streptococci. Sections stained for bacteria. The picture is typical of a pyelonephritis (Fig. 26). Glomeruli are normal throughout the section save where they are secondarily invaded by suppurative processes within the neighboring tubules and are even then free from bacteria. Everywhere the tubules are dilated and filled with pus and desquamated epithelial cells. There is considerable lymphocytic and moderate pus-cell infiltration of the interstitial tissue. Bacteria are rarely seen in the interstitial tissues. Large numbers of gram-negative bacilli are found among the pus-cells of the dilated tubules (Fig. 27). As a rule no bacilli are to be found in glomeruli. In few of the larger veins and arteries an occasional bacillus is seen (Fig. 28).

In some of the tubules masses of bacilli are to be found apparently occupying what was once the lumen of a tubule. In some instances in what appears to be an abscess are to be seen the remnants of three or four tubules filled with bacilli serving as the centers of infection for the confluent mass which has resulted in small abscess formation. There are no cocci.

CASE 33. A topsy No. 570. South Surgical No. 34 pp. 94, 52-240. Female, age 56. November 5, 1890. Diagnosed fibroma uterus. Past history entirely negative as regards kidney symptoms. Entire complaint is vaginal discharge and hemorrhage. Physical examination negative save for the presence of a large fibroid uterus. Operation: Complete hysterectomy with drainage. Patient extremely poor condition from shock at the end of operation. After operation patient continued to run a swinging temperature varying from 100 to 102°. Developed tenderness in both costovertebral angles. Gradually failed and died on fourteenth day. No specimen reported on day of death was said to have shown no alb. min. sediment was done. Autopsy 29½ hours post-mortem. Anatomical diagnosis: Hysterectomy circumscript peritonitis with purulent infiltration and necrosis of tissues of the abdominal wall near wound, multiple old infarcts of spleen, chronic mitral endocarditis, leukithiasis, suppurative nephritis.

Kidney: Capsules strip easily and leave granular surface thickly dotted over with gray opaque mottling. On section cortex is increased in width 3 to 9 millimeters. Cortices present a mottled gray opaque appearance from the presence of numerous discreet and confluent pinhead sized opaque areas. Pyramids show gray lines. The

mucosa of the pelvis shows reddening and hemorrhagic areas. Bladder reddened.

Bacterial flora. Cultures from heart, liver, spleen and kidneys show colonies of a bacillus which was not classified but seemed from its growth on agar to belong to the colon group.

Microscopic examination. In both kidneys show some post mortem degeneration extensive infiltration of polynuclear leucocytes with disappearance of the renal epithelium over considerable areas of the kidney so that abscesses are formed some dilated tubules filled with polynuclear leucocytes and epithelial cells (Fig. 29).

Section stained for bacteria. The picture is typical of a pyelonephritis (Fig. 30). Glomeruli are as a rule free from bacteria and also free from pus save where invaded from neighboring tubular processes. The interstitial tissue shows considerable lymphocyte and some pus cell infiltration. Throughout the section the tubules are dilated and filled with clumps of bacteria and desquamated epithelium. Few bacteria are found outside the tubules. Where bacteria are found outside the lumina of tubules the renal epithelium is usually extensively destroyed with evidence of liberation of the contained bacteria (Fig. 30). Where dense abscess formations appear close observation shows the centers of upurulation to be remnants of tubules which have been extensively destroyed. The appearance of true abscess is due to influence of the destructive processes in several neighboring tubules. There are no cocci seen in the section. Large number of gram negative bacilli mostly in tubules are clearly the etiological factor in the process.

Note.—The striking similarity between the findings in this case and the preceding Case 3 is of interest because in the former the conditions for ascending infection exist while in this case no stretch of the imagination can the bladder be made red the origin of the renal condition. One might be an ascending infection the other clearly cannot be yet the pathological pictures presented are indistinguishable.

In this group of cases acute pyelitis and also chronic pyelitis are shown in Cases 29, 30, 31, 32 and 33. Acute pyelonephritis does not appear and its incidence is inferential as we shall later show. Chronic pyelonephritis is shown in Case 30 as is pyonephrosis.

INFECTION OF THE KIDNEY WITH BOTH PYOGENIC AND PYOGENIC ORGANISMS WILL PRODUCE A MIXTURE OF THE LESIONS CHARACTERISTIC OF BOTH GROUPS.

This fact we believe explains the not uncommon fallacy that the colon bacillus will produce abscess of the kidney. This has been freely stated and appears to have been supported by the evidence of cultures ob-



Fig. 31. Microphotograph (true blue) due to bacilli. One of the organisms is the colon bacillus the other a gram positive organism. Photo by L. Brown & Co.

tained from the kidney. The reasoning we have shown to be fallacious for two reasons. First cultures containing both colon bacilli and cocci will frequently be interpreted as showing only colon bacilli since this organism grows with great rapidity and readily obscures the colonies of cocci. Second it has been assumed that the cultures obtained from one part of a kidney represented the lesions produced in the whole kidney. This we have shown to be fallacious by the actual demonstration of bacilli in one portion of the kidney cocci in another and cocci and bacilli associated together in still other portions (Fig. 31). Our experience has led us to believe that in these mixed infections the colon bacillus probably precedes the coccus in point of time. Only in this way can be explained the appearances in certain kidneys which will be below described. These mixed lesions are rather likely to be found in cases occurring in Group II of our classification.

that is to say kidneys handicapped by previous disease. In support of these propositions we submit Cases 34 to 56 showing mixed infection with cocci and bacilli Cases 67 and 68 showing infection with two different kinds of cocci, and Cases 59 and 60 showing infection with two different kinds of bacilli.

CASE 34. Autopsy No. 84 West Medical, 564-88. Female age 51. Alth: 100. *Present illness.* Six days ago became dizzy (uræmia?) fell, and had a severe convulsion followed by mental aberrations. *Urin.* acid, 0.07 albumin 1/4 per cent. very small amount of pus and casts. *Temperature* varied about 100. *Hbts.* blood count 18,000 which later rose to 45,000. Patient gradually lost strength, became more irrational becoming comatose. Temperature became subnormal and death occurred sixth day. *Clinical diagnosis.* Chronic nephritis.

Autopsy. 8 hours post-mortem. Anatomical diagnosis. Chronic interstitial nephritis, suppurative nephritis, congenital malformation of the kidneys and anomaly of the right ureter, bronchiectasis with concretion, edema of the lungs, hydrothorax.

Kidneys. Small and of unequal size. Weight of left kidney 13 grams, right kidney weighs 5 grams. Left kidney shows focal lobulations and deformity. Capsule adherent. The markings are scarcely recognizable. In two areas are small cysts. Abnormal arrangement of the renal arteries. Right kidney is also deformed, its pelvis being nearer one pole than usual. Capsule adherent. The distinction between cortex and pyramids is obscured. The markings of the cortex are absent. At one point in the renal tissue is a cavity 6 millimeters in diameter full of pus. Ureter is of normal caliber until near the bladder when it becomes dilated. Its orifice in the bladder not found but in the situation of its orifice is a swollen area which on section exudes thin purulent fluid. A fibrous cord connects the pelvis with the lower portion of the ureter to which it is joined a few millimeters from the bladder. It has no lumen. *Bacteriological report.* Liver and spleen show bacillus coli communis. *Sections stained for bacteria.* show many staphylococci in plugs in a few of the tubules, a considerable number of gram-negative bacilli are found in the pelvis of the kidney. There are no abscesses in the sections preserved.

CASE 35. Autopsy No. 1076 West Surgical 43-63. Male age 40. June 24 1902. Patient brought to Accident Room unconscious with fracture of cervical vertebra. *Urin.* examination on admission negative. Six months later slight trace of albumin, hyaline casts much pus. Patient has been catheterized since July. *Irrregular temperature* with occasional chills for past four months. Death from exhaustion and sepsis on three hundred twentieth day. *Clinical diagnosis.* Cervical fracture.

Autopsy. 6 1/2 hours post mortem. Anatomical diagnosis. Calculus pyelitis and ureteritis with suppurative nephritis of the right kidney obstructing stone in ureter, cystitis, infarct right lung, scar of old fracture of cervical vertebra.

Kidneys. Combined weight 440 grams. Capsules strip easily leaving smooth surface, however some red mottling. Left kidney shows fairly firm tissue without narrowing of the cortex. In places the section surface is mottled with red areas. The right kidney tissue is somewhat soft, section surface generally pale with retained markings. The cortex is slightly narrow. In many places and especially in the cortex are numerous small red areas. The pelvis of the right kidney is dilated, its mucosa is grayish red and bathed in dirty yellowish purulent material. The calices are dilated and contain small yellowish secretions. The upper portion of the ureter for a distance of 2 centimeters is dilated, its mucosa roughened and grayish to red in color. Its lumen is occluded by small tissue. Below this situation the ureter is normal in size. Its mucosa is smooth showing here and there a few small ecchymoses. The left ureter is normal. Bladder shows dirty yellowish foul fluid and its mucosa presents numerous red patches.

Microscopic examination. Right kidney shows extensive infiltration with round cells. Places also infiltration with leucocytes. The left kidney shows renal tissue to be infiltrated in areas with pus cells, and the normal kidney structure is disintegrated at these points.

Bacteriology report. Cultures from the heart, liver and spleen show liquefying serum of growth of bacteria. *Sections stained for bacteria.* A considerable variety of bacteria some of which are staphylococci are found scattered throughout purulent areas in the kidney. Many bacilli.

CASE 36. Specimen number 92-6 South Surgical, 76- Male, age 53. February 9, 1900. *Present illness.* For two months has had a bundle on the back of the neck. For one month has had nausea, some vomiting and intestinal disturbance chiefly diarrhea.

Operation. Appendectomy. Chronic appendix found not removed. Following operation a patch of dullness located in left lower back. *Clinical course.* showed small amount of pus from the right ureter. A negative culture from the bladder urine showed colon bacilli with a few colonies of staphylococci. Cultures from the appendix wound which had become septic showed staphylococcus aureus and colon bacilli. Diagnosis of acute hematogenous kidney and operation determined upon. Small perinephritic abscess found and cultures from which showed staphylococcus aureus. The kidney was found and generously sprinkled with small abscesses. Nephrectomy done.

Pathological report. Kidney considerably enlarged, weight 300 grams. Capsules thickened. There is a large abscess at one pole of the kidney and numerous small abscesses scattered throughout.

the remainder of the kidney cortex. These are filled with thick tenacious pus showing small micrococci in clumps.

Microscopic examination showed multiple abscesses. Diffuse round-cell infiltration of remaining tissue with obliteration of tubules and glomeruli.

Pathological diagnosis Focal suppurative nephritis.

Sections stained for bacteria A large number of staphylococci and a moderate number of gram negative bacilli are found in the small abscess cavities and some of the tubules and occasionally in the lymph-spaces of the interstitial tissue.

CASE 37 Autopsy No 859 South Surgical LN 258 Male age 56 March 6 1902 *Past history* Gonorrhoea 36 years ago stricture developed six years later. Has frequently had retention *Present illness* Inability to pass water. *Urine* small trace of albumin large amount of pus.

Operation Internal and external urethrotomy for multiple stricture. Patient had uneventful convalescence for 10 days at which time he had a sudden rise of temperature to 103 nervousness and some vomiting. A few days later patient developed diarrhoea. He died on the thirty-third day.

Clinical diagnosis Multiple stricture of urethra.

Autopsy 19 hours post mortem. Anatomical diagnosis Chronic cystitis with extension through the bladder wall and through the perivesical tissue dilatation of the ureters double hydronephrosis ureteritis pyelitis suppurative nephritis suppurative focal pneumonia atheromatous endocarditis of the aortic valve healed perineal wound for stricture of urethra stricture of urethra at the penoscrotal angle.

Kidneys In each renal pelvis opaque purulent fluid. Kidneys are unequal in size weight not given. Capsules slightly adherent. At various points on the free surfaces are yellow slightly elevated areas which on section contain milky white pus. The kidney tissue covering the more dilated portion of the pelvis shows atrophy and the markings are obscured. The cortex is diminished in width.

Microscopic examination Kidneys show increase in the interstitial connective tissue atrophy of the tubules infiltration with small round cells some hyaline atrophy of the glomeruli. Some of the tubules show many pus-cells.

Bacteriological report Fluid expressed from the kidney shows a number of bacteria many of them gram negative bacilli staphylococci and streptococci. Cultures from the heart no growth liver and spleen, bacillus coli communis kidney many varieties of bacteria.

Sections stained for bacteria show staphylococci in the tubules colon like bacilli in the blood stream and staphylococci and bacilli in the pelvis.

CASE 38 Autopsy No 1817 West Surgical 545-107 Male age 79 October 1 1906 *Past history* For past 15 years has led catheter life on account of enlarged prostate. *Present illness* Four days ago broke his catheter leaving four inches in his bladder. Temperature normal on admission.

Urine alkaline slight trace of albumin sediment pus and blood-cells. *Operation* Perineal section for foreign body followed by partial suprapubic prostatectomy. Patient died as immediate result of this second operation on forty-sixth day after admission. *Clinical diagnosis* Enlarged prostate and senility.

Autopsy 6 hours post mortem. Anatomical diagnosis Diptheritic cystitis ureteritis and pyelitis suppurative nephritis right operation wound prostatectomy arteriosclerosis fibrocalcereous endocarditis focal tuberculosis of liver.

Kidneys Combined weight 240 grams. Capsule of left kidney strips leaving a firm smooth surface. Capsule of right kidney strips leaving a firm smooth surface showing here and there small abscesses. The pyramids in places show thin grayish yellow streaks. The mucosa of the pelvis is covered with a grayish yell w necrotic membrane. This material extends along the mucosa of the ureter over its entire length. The ureter moderately dilated. The mucosa of the bladder is covered with exudate and contains foul urine. The walls of the bladder are thickened and in several places there are small diverticula. In the situation of the prostate there is a grayish ragged necrotic cavity.

Bacteriological report Cultures from the heart blood yield no growth from the spleen profuse growth of bacilli. *Sections stained for bacteria* No blocks of kidney tissue were preserved. Sections from the prostate and liver show many staphylococci and a few bacilli. The prostate shows some glandular elements filled with pus in which the bacteria are located. The bacteria in the liver are found in the central veins.

CASE 39 Autopsy No 2220 West Surgical 600-53 Female age 40 September 22 1908 *Present illness* For one year definite symptoms of gall stones. Temperature normal. *Urine* negative. *Operation* cholecystostomy cholecystectomy Moderate sepsis of wound moderate temperature. Seventh day after operation patient became drowsy urine considerably decreased in amount bloody small trace of albumin some pus considerable number of cellular casts. Patient died eighteenth day.

Clinical diagnosis Cholelithiasis pyonephrosis.

Autopsy 6½ hours post mortem. Anatomical diagnosis cystitis ureteritis pyelitis suppurative nephritis arteriosclerosis slight fibrous endocarditis of the aorta and mitral valves ulceration of the intestines chronic peritonitis operation wound cholecystectomy and cholecystostomy.

Kidneys Combined weight 310 grams capsules strip. Surfaces are mottled with many small discreet and confluent yellowish areas which bulge in some places. Section surfaces are mottled with dirty yellowish areas which extend well down into the pyramids. The mucosa of the pelvis shows many minute ecchymoses and small areas of fibrin. The ureters are free and contain pus. The mucosa of the ureters shows ecchymoses bladder the same.

Microscopic examination Kidneys show many abscesses and extensive leucocytic infiltration.

Bacteriological report. Cultures from the heart blood and spleen show no growth from the kidney bacilli.

Sections stained for bacteria show mixed staphylococcus gram-negative bacillus abscesses of cortex.

CASE 40. Autopsy No. 21 West Medical, 710-33 Male, age 25, October 6 1908. **Present illness** Three weeks of pain in the right kidney region with fever and for four days severe vomiting. **Temperature** 102 to 105. **Urine** acid slightest possible trace albumin, rare cast with pus-cells adherent considerable pus. White blood count, 25,600. Guinea pig inoculated promptly died. Death too early for evidence of tubercle. Patient died fourth day. **Clinical diagnosis** Haematogenous kidney.

Autopsy 3½ hours post mortem. Anatomical diagnosis Septic infarcts and multiple abscesses of right kidney thrombosis right renal vein, acute localized peritonitis of the right side of the abdomen septic infarcts and multiple abscesses of lungs, soft spleen, staphylococcus pyogenes aureus septicemia.

Kidneys Left kidney weighs 7 grams, tissue is somewhat soft kidney not otherwise remarkable. The right kidney is enlarged. The cortex is mottled with minute yellow areas from some of which pus oozes when the capsule is removed. On section the markings are lost. Here and there are dark red areas in some of which the central portions show abscesses. The mucosa of the pelvis shows ecchymosis. Both ureters are free. The right renal vein is occluded by a large thrombus.

Microscopic examination of the kidney is not recorded.

Bacteriological report. Cultures from the heart blood, spleen and right kidney show profuse growth of staphylococcus pyogenes aureus and a slight growth of bacilli.

Sections stained for bacteria show staphylococci in the abscesses apparently in pure growth, staphylococci and bacilli in the pelvis.

CASE 41. Autopsy No. 83 West Surgical, 380-238. Male age 40 November 6 00. **Past history** Gonorrhoea 7 years ago. Now has evidence of stricture. **Present illness** Acute retention. This morning unsuccessful attempt made by his own doctor at catheterisation. **Temperature** normal. **Urine** albumin, trace, sediment much pus and blood. **Operation.** Dilatation of stricture. Three days later chill fever vomiting followed by suppression of urine.

Operation. Right nephrotomy for pyonephrosis. Kidney found to be dilated apparently recent infection. Operation did not improve patient's condition and he died fifteenth day. **Clinical diagnosis** Stricture of urethra, pyonephrosis.

Autopsy 10½ hours post mortem. Anatomical diagnosis Malformation of kidneys with extensive suppurative nephritis 1 tiny metamorphosis

liver hyperplasia spleen, hypertrophy and dilatation of heart inguinal operation wound.

Kidneys In the region of the operation wound is an irregular mass of tissue which extends into the abdomen. This is found to consist of kidney tissue and measures about 4 centimeters in length. Capsule strips leaving a fairly smooth yellowish brown surface showing in several places yellowish brown areas which on section contain pus. **Cover glass preparations** from this material show numerous leucocytes and a few bacilli. Two ureters are present. The left ureter leads to the pelvic mass of kidney tissue above described, the right opens into the shell of tissue in the right inguinal region.

Microscopic examination. In three sections of the kidney there is considerable post mortem change and much suppurative nephritis.

Sections stained for bacteria show in the centers of the suppurative areas many staphylococci. A section of the liver shows numerous gram-negative bacilli and staphylococci in the central vein. There are many gram-negative bacilli in the tubules and some suppurative areas surrounding dilated tubules filled with bacilli and cocci.

CASE 42. Autopsy No. 827 East Medical, 56-38 Male age 53 December 27 1900. **Present illness** Symptoms of cerebral embolism of sudden onset. Was put on constant drainage on account of incontinence. Developed urethritis. **Urine examination** at entrance and all through stay in hospital showed albumin and moderate quantities of pus. Fourteenth day in hospital developed carbuncle. Developed lung symptoms. Culture from carbuncle showed growth of staphylococcus aureus. Died forty-seventh day. **Clinical diagnosis** Cerebral embolism.

Autopsy 3½ hours post mortem. Anatomical diagnosis, chronic cystitis, pyelitis, slight dilatation renal pelvis and ureters suppurative nephritis, arteriosclerosis vessels of Willis, degeneration of posterior columns and crossed pyramidal tracts of the spinal cord.

Kidneys Capsules strip surfaces present here and there many brownish yellow spots and indurations. On section through these indurations yellowish mucous pus is obtained. On section kidney shows scattered brownish yellow spots and faint streaks. The pelvis of the kidneys show some dilatation with numerous areas of ecchymosis in the walls. Ureters are moderately dilated and filled with thin fluid pus. Ureteral openings are free. Bladder shows areas of ecchymosis and contains a moderate amount of thin pus. Two small abscesses of the prostate.

Cultures of the heart and liver show growth of bacillus coli communis.

Microscopic examination. Foci of suppuration and small abscesses are present. In these are many mononuclear and polynuclear leucocytes. There is a considerable increase in interstitial connective tissue but without lesions of the glomeruli characteristic of chronic glomerular nephritis.

Sections stained for bacteria. I redominant organism scattered throughout the tissue where there is evidence of suppuration is colon like bacillus. In some areas cocci are to be seen and in still others particularly the cortical abscesses the majority of bacteria are staphylococci.

CASE 43. Autopsy No 522 South Surgical 40-80 Male age 63 September 23 1899. *Present illness.* For three months has had bladder irritability nausea vomiting and hematuria has been catheterizing himself since onset of symptom. Patient entered hospital with symptoms of uræmia. Ure acid albumin 4 per cent sediment pus and blood. Died day of entrance. *Clinical diagnosis.* Enlarged prostate.

Autopsy 13 hours post mortem. Anatomical diagnosis. Adenocarcinoma of the bladder in olving both ureters. Orchitis cystitis and hydronephrosis with dilatation left ureter acute pyelitis right kidney abscesses of both kidneys chronic interstitial nephritis hypertrophy of heart.

Kidneys. Capsules strip easily. Here and there in both kidneys are small pinhead sized abscesses.

Miscoscopic examination. Sections of the kidneys show marked increase of interstitial tissue with some infiltration with round cells. Tubules of the cortex are greatly diminished in number. Some of those that are present are atrophied and contain hyaline casts. In one section there is moderate infiltration with polymorphous neutrophilic leucocytes. *Cultures from the heart and spleen in growth.* Cultures from the kidney bacillus of immunitis.

Sections stained for bacteria. Small abscesses previously described show many staphylococci. A few staphylococci are also found in tubule. Many gram negative bacilli are found in the pelvis of the kidney in one section. Gram negative bacilli and cocci are found in the other two sections one of which contains an abscess.

CASE 44. Autopsy No 304 East Surgical 340-83 Female age 58 August 1 1898. *Present illness.* For six weeks loss of appetite and vomiting frequent micturition. For one week pain in the angle of the right jaw. Examination shows alveolar abscess white blood count 8880. Urine acid albumin slight trace sugar sediment considerable pus. Transferred to Surgical Service. *Operation.* Alveolar abscess drained. Death of the patient from general septicæmia. *Clinical diagnosis.* General septicæmia alveolar abscess diabetes.

Autopsy 14 hours post mortem. Anatomical diagnosis. Abscess of kidneys bronchopneumonia with abscess of the lung arteriosclerosis wound of neck general infection staphylococcus pyogenes aureus.

Kidneys. Enlarged total weight 462 grams. Capsules adherent. On section several dark red areas are seen scattered through the kidney tissue some extending from the cortex well into the pyramids. These areas show softening and many of them have yellowish white areas within them which yield pus. Marking retained. In one area

there is a firm yellowish pyramidal area fibrous in character situated between the cortex and the pyramid. Pelvic mucosa slightly injected bladder shows nothing remarkable.

Bacteriological remarks. Abscess of neck heart spleen liver and kidneys show profuse growth of staphylococcus pyogenes aureus. Cover glass preparation of pus from kidney abscess shows staphylococci and numerous large irregularly stained bacilli.

Miscoscopic examination. Kidney abscesses show staphylococci in many areas phagocytosed.

Sections stained for bacteria. Many abscesses are found situated in the cortex. Small abscesses originating in the tubules sometimes in the convoluted portion at other times in the ascending and descending loops are to be found. These small secondary abscesses uniformly and like the apparently primary larger abscesses in the cortex. The abscesses frequently show large clumps of bacteria which may be seen macroscopically lying within the necrotic area. In most instances bacilli alone are to be found in the tubules while in still others the process is mixed. Bacilli and cocci are occasionally found in clumps arranged down the collecting tubules. There are both bacilli and cocci in the pelvis of the kidney.

CASE 45. Autopsy No 301 East Surgical 338-106 Male age 65 July 11 1898. *Past history.* Frequent micturition with flowing stream for six years. *Operation.* Stricture one year ago. *Present illness.* Recurrence of same symptoms. *Physical examination.* Shows stricture of bulb. *Operation.* Division of stricture. Urine at entrance alkaline albumin 10 per cent much pus few red blood-cells. Sixteen days after operation developed temperature and pain in the right kidney region. Temperature increased suppression of urine distention patient died seventeenth day. *Clinical diagnosis.* Stricture urethra.

Autopsy 18 hours post mortem. Anatomical diagnosis. Suppurative nephritis pyelitis ureteritis slight dilatation of renal pelvis and ureter on right side hypertrophic bladder with diverticula and cystitis arteriosclerosis cardiac hypertrophy edema and congestion of lungs hemorrhagic infarction of kidney.

Kidneys. Capsules strip leaving smooth surface. On section tissue mottled red and yellow. In the pole of the left kidney chestnut sized red spots scattered throughout tissue many pea sized abscesses. Some of these abscesses continue as dark red areas down into the pyramids. The papillary portion of the pyramids shows yellowish white streaks. *Cultures from kidneys.* show staphylococcus aureus and colon bacilli. *Sections stained for bacteria.* No abscesses in sections preserved. Gram negative bacilli clumps of staphylococci and some bacilli are found in the convoluted tubules.

CASE 46. Autopsy No 1164 South Surgical 87-55 Male age 63 November 5 1903

Present illness Eight years ago abscess of perineum, now has filliform stricture. **Urine** at entrance acid, trace of albumin, sediment clumps of pus, occasional red blood-cell. Patient ran an irregular temperature and died, after operation on the seventy-third day.

Clinical diagnosis Stricture of urethra, cystitis. **Autopsy** Anatomical diagnosis Pyonephrosis, cystitis, chronic urethritis, perineal fistula, dilatation of ureters and ureteritis, abscess of left kidney chronic interstitial nephritis, abscess of left epididymis and testicle, streptococcus septicemia.

Kidneys Somewhat smaller than normal capsule adherent. Pelvis, calices and ureters on the right are markedly dilated and filled with a thick yellow pus. The course of the right ureter is tortuous and at its lower extremity at the bladder wall forms somewhat of a cul-de-sac. The right pelvis is blackish in color and granular. The walls of the pelvis and ureter are thickened. The pyramids of the right kidney are flattened and the cortex narrowed. The markings are bared. The left renal pelvis, calices and ureter are also dilated. They do not yield pus. At two or three places there are cavities in the substance of the kidney filled with pus. The walls of the kidney pelvis and ureter are thickened. The bladder mucosa is dirty blackish in color and rough.

Microscopic examination. A section from one kidney shows fibroid atrophy of portions of the renal tissue and an abscess.

Bacteriological report. Cultures from the heart blood show a few streptococci. **Sections stained for bacteria** show staphylococci and gram-negative bacilli scattered throughout the kidney sections. It is impossible to differentiate the extent of post mortem invasion.

CASE 47. Surgical Case No. 934. South Surgical 172-5. Female, age 43. November 1908. **Past history** negative save for symptoms attributed to the appendix. **Present illness** For one week patient has had abdominal pain localizing in the right loin with chills and fever. **Temperature** at entrance 102. **White blood count** 5,400. **Urine** acid, small trace of albumin, considerable pus.

Rectal examination shows tenderness high up in the rectum with edema and fluctuating mass. **Operation** 1. Dissection and drainage of ischio-rectal abscess. **Second operation** appendectomy and nephrotomy with drainage of hematogenous kidney. Specimen excised for examination.

Pathological report. Two small pieces removed from surface of the kidney red, hemorrhagic with red cells and some leucocytes. **Section stained for bacteria** shows staphylococcus and large gram-positive bacilli in abscesses.

CASE 48. Autopsy No. 2635. South Surgical 266-85. Male, age 64. September 3, 1902. **Past history** Frequent catheterization for past ten years on account of bladder inflammation. **Present illness.** Complaint frequency **Urine** acid, trace of albumin, leucocytes and many bacteria. **Operation** Exploratory laparotomy for

tumor of the bladder. Bladder palpated but not opened. Operation wound remained clean. After operation patient failed without apparent cause and died thirteenth day. **Clinical diagnosis** Multiple diverticula enlarged prostatic cardiac insufficiency.

Autopsy 8 hours post mortem. Anatomical diagnosis Suppurative nephritis, acute pyelitis, arteriosclerosis degeneration of kidneys, hypertrophy of prostate, hypertrophy of bladder wall with diverticula, operation wound.

Kidneys Combined weight 20 grams. Capsules strip leaving granular surfaces the tissue is quite firm. The cortex measures 3 to 6 millimeters. Here and there the section surfaces are streaked and mottled with small yellow areas. The pelvis and calices are moderately dilated. The mucosa is generally reddened. The walls of the bladder are thickened. A few diverticula and one large one are present. The prostate is considerably enlarged.

Microscopic examination. There is extensive infiltration with polymorphous leucocytes, in one or two places abscess formation.

Bacteriological report. Cultures from the heart blood show growth.

Sections also sent for bacteria. Sections from the kidney tissue which were preserved show but little suppurative process. Staphylococci and bacilli are found, few in number in the pelvis.

CASE 49. Autopsy No. 32. South Surgical 9-4. Male, age 66. August 1893. **Present illness** Prostatic symptoms seven years. Catheterized one month ago and apparently infected at that time. **Operation** Prostatectomy. **Urine** smoky acid, large amount of pus some blood large trace of albumin. Died twenty-eighth day. **Clinical diagnosis** Hypertrophy of prostate, pneumonia.

Autopsy 6 hours post mortem. Anatomical diagnosis Suprapubic cystotomy and partial prostatectomy. Abscess of region of Scarpa's triangle with sinus formation, thrombosis right femoral vein, abscess of lungs, acute pyelitis with abscesses of kidney ulcerative prostatitis.

Kidneys In both renal pelvis marked induration of mucosa with some patches of exudate. Cortex 5 millimeters. Tissue slightly pale and in some of the pyramids grayish yellow streaks in the papilla. In one kidney there are two or three pinhead sized abscesses. Sections of the small abscesses of the kidney show micrococci with cloudy swelling of the epithelium of the cortical tubules.

Section stained for bacteria show staphylococci in abscesses, bacilli in the yellowish streaks in the papilla lying within the tubules, bacilli and cocci in the pelvis.

CASE 50. Autopsy No. 2030. West Medical 502-5. Female, age 47. October 6, 1911. **Present illness** Two years of abdominal symptoms, one week of diarrhea followed by distention of the abdomen and abdominal pain with much vomiting.

Temperature at admission normal. Later a somewhat irregular fever reaching 100. Urine at admission no albumin, rare leucocytes. White blood count 8500. *Clinical diagnosis* Cancer of the stomach disseminated abdominal cancer.

Autopsy 28 1/2 hours post mortem. *Anatomical diagnosis* Diffuse carcinoma of the stomach with extensive metastasis including the right kidney, carcinomatous strictures of the large intestine, left bronchopneumonia, chronic endocarditis of the mitral valve with stenosis, suppurative nephritis, hydronephrosis right due to constriction of the ureter by neoplasm, small infarct of lung.

Kidneys Combined weight 284 grams, right kidney is small. There is much perinephric induration and thickening marked about the ureter, especially in its upper portion. The pelvis and calices of the right kidney are dilated and contain a cloudy fluid. The surface of the right kidney is fairly smooth with a few ill-defined gray white areas both discrete and confluent. On section these areas extend for a variable distance into the renal tissue beneath. The markings of the cut surfaces are obscured. The renal cortex is narrowed. The cortex of the left kidney shows numerous small abscesses. The tissue about these in many instances is dark red. These areas are seen to extend into the cortical substance in the form of yellowish gray streaks. The ureter is not dilated. The bladder is negative.

Microscopic examination One section from the right kidney shows an area of carcinoma. There are numerous areas of suppurative nephritis.

Bacteriological report Cultures from the heart blood show scum of growth (several types of bacilli).

Sections stained for bacteria Abscesses show only cocci, some gram negative bacilli are found in the lymphatics and the blood stream. In the pyramidal portion of the kidney, large plugs of bacteria, both cocci and bacilli are found in the tubules.

CASE 51 Autopsy No 1352. Genito urinary 10-155. Male, age 28. April 15, 1914. *Past history* Stricture of urethra for five years, in terminal urethrotomy three years ago. *Present illness* For one year has had recurrent pains in right kidney without fever. For two weeks has had increased frequency followed by severe pain in region of right kidney and vomiting. His urine has been much more cloudy than previously. *Urine* acid, cloudy, large amount of albumin, much pus and a few red blood-cells. *White blood count* 19000. *Cystoscopy* showed cloudy urine from the right side with markedly decreased function, left kidney moderate amount of pus, 10 per cent function. *Cultures* from both kidney urines showed colon like bacillus. *X-ray* showed right renal calculus. *Operation* Right kidney full of small calculi removed by pyelotomy and nephrotomy. Left kidney showed perinephric abscess with many multiple abscesses in cortex. Patient died fourteenth day. *Clinical diagnosis* Calculus pyelonephritis, right acute suppurative nephritis, left uræmia and pneumonia.

Autopsy 13 1/4 hours post mortem. *Anatomical diagnosis* Nephrothiasis, diphtheritic pyelitis and pyonephrosis, perinephritis with abscess formation, chronic interstitial nephritis, right with chronic ureteritis, double nephrotomy with purulent infiltration of perinephric tissue, tuberculosis of the lungs, bronchopneumonia, focal necrosis of the bladder, absence of left testicle, scar of old cystotomy, fatty liver, streptococcus septicæmia.

Kidneys Combined weight 330 grams. Abscess of perinephric tissue about each kidney. Right kidney shows adherent capsule. Surface is marked with occasional irregular depressions. In the substance of the kidney extending from the convexity to the pelvis is an irregular excavation bounded by ragged necrotic kidney tissue bathed in pus (Nephrotomy wound). The pelvis is moderately dilated, its mucosa covered with a dirty white layer. All the calices are dilated and contain irregular granular concretions and pus. The cortex is markedly narrowed. The left ureter is adherent to the surrounding tissue. Its mucosa is smooth. The right kidney has an adherent capsule on removal of which several cavities filled with yellow pus are exposed. There are numerous pinhead sized abscesses on the surface. In the substance of the kidney extending into the pelvis is an irregular cavity bounded by necrotic tissue (Nephrotomy wound). The renal pelvis is moderately dilated and filled with pus, two concretions. The mucosa of the pelvis shows an adherent dirty layer. The left ureter is not remarkable. The bladder and prostate are normal.

Microscopic examination One section of the kidneys shows suppurative nephritis, another section shows atrophy and a round cell infiltration. At the tip of the pyramids in one section is necrosis and purulent infiltration.

Bacteriological report Cultures from the heart blood show profuse growth of colon like bacilli and cocci. *Sections stained for bacteria* In the section preserved there were no abscesses and small evidence of suppuration. Many staphylococci and a few gram negative bacilli were found in the pelvis.

CASE 52 Surgical Case No 8127. East Surgical 506-207. Female, age 25. January 9, 1908. *Past history* Painful micturition since childhood. *Present illness* Four days of right-sided abdominal pain with vomiting, later pain localized in right kidney region, urine became cloudy. *Urine* at admission alkaline, slight trace of albumin, much pus. *Temperature* 103. *White blood-cell count* 15,600. *Physical examination* showed a mass similar to appendix abscess and thought to be that. *Operation* Exploratory laparotomy and nephrectomy for acute infected kidney. Uneventful recovery. *Cultures* peritoneal fluid, no growth, pus from kidney abscess shows few cocci and bacilli. *Clinical diagnosis* Acute infected kidney.

Pathological report Kidney very much enlarged. On the surface multiple small purulent foci, on section the same are seen in the cortex of the kidney more rarely in the papilla.

Microscopic examination. Infiltration with round and pus-cells and destruction of the tubules especially in small foci.

Sections stained for bacteria. No true cortical abscesses found in tissue. The picture is more that of a colon bacillus pyelonephritis with tubules the center of suppuration. Bacteria found in these areas show mixed infection of staphylococci and gram-negative bacilli, the latter predominating.

CASE 53. Surgical Case No. 710-17 South Surgical, 541 Female, age 34, October 9, 1907. **Present illness.** Eight days ago onset of abdominal pain in region of appendix with fever which quickly subsided leaving soreness in region of kidney. **Physical examination.** Right kidney palpable and tender. X-ray negative. **Urine** 1 entrance acid, slight trace of albumin, some pus. **White count** 7,300. Guinea-pig inoculation negative for tuberculosis. **Operation.** Nephrectomy. Kidney slightly enlarged, pale, few areas of discoloration. It was thought to be the cause of the trouble and removed. **Clinical diagnosis.** Coli-pyelonephritis. **Recovery.**

Pathological report. Enlarged soft kidney with opaque yellow stripes and dots in the pyramids surrounded by reddened zones.

Microscopic examination. Foci of round-cell infiltration in many places with intense congestion of surrounding vessels. Epithelium of the tubules swollen, disquamated and the lumen filled with hyaline and granular casts. **Cultures** from the kidney tissue at operation, colon bacilli.

Sections stained for bacteria. Considerable number of gram-negative bacilli in the tubules and pelvis with a typical picture of colon pyelonephritis. Here and there in the cortical region are small abscesses with a mixed infection of gram-negative bacilli and large numbers of staphylococci.

NOTE.—A colon pyelonephritis with superimposed staphylococcus abscess.

CASE 54. Autopsy No. 364. West Surgical, 595-561 Female, age 54, May 28, 1908. **Past history.** Marked constipation for four months. **Present illness.** For five days acute abdominal left-sided pain with chills and fever, temperature of 102-104, with pusy urine.

Two days ago acute tender red mass appeared in the left kidney region. **Urine** acid, very slight trace of albumin, small amount of pus, microscopic blood. **White blood count**, 22,000. Culture from the urine shows colon-like bacilli. **Operation.** Nephrotomy for septic kidney. Kidney considerably and symmetrically enlarged, soft and pulpy with scattered small abscesses of the cortex. Pelvis not dilated. Patient died 10 days after admission, fourth day after operation. **Clinical diagnosis.** Septic kidney.

Autopsy 7 1/4 hours post-mortem. Anatomical diagnosis. Carcinoma of vagina with obstruction and dilatation of left ureter; left ureteritis, pyelitis and suppurative nephritis, nephrotomy wound, streptococcus septicemia.

Kidneys. Right kidney weighs 171 grams. Capsules strip with some difficulty leaving a granular surface. Cortex measures 6 millimeters. Markings are fairly distinct. There are no abscesses in the right kidney. Right ureter is not remarkable. Left kidney weighs 208 grams, perinephric fat separated from the kidney and the space is filled with bloody purulent material. On the convexity of the kidney there is an irregular opening 6 centimeters in length leading into the pelvis. The walls of this cavity are composed of soft necrotic kidney tissue. At various places in the cortex and extending into the pyramid the kidney tissue is transformed into soft yellowish black, semi-fluid material. These areas are wedge-shaped with free pus at the surface. Generally they are sharply outlined from the surrounding renal tissue. The surface of the cortex where not involved in the above-mentioned necrotic area about the wound shows indistinct markings. There are no abscesses of the kidney. The mucosa of the pelvis and ureter are reddened and the lumen contains purulent areas. The lower half of the ureter is dilated and its lower end is pressed upon by tumor mass.

Microscopical examination. Shows acute degenerative change with suppuration.

Bacteriological report. Cultures of the heart blood and spleen show streptococcus and colon like bacilli.

Sections stained for bacteria. There are clumps of streptococci in small arteries and in the capillaries of the glomeruli. There are a few clumps of streptococci and gram-negative bacilli in the straight collecting tubules. There are also a few bacilli in the blood stream.

CASE 55. Autopsy No. 880. West Medical, 570-6 Male, age 5, May 28, 1902. **Present illness.** Six months weakness, some nausea, occasional vomiting, restlessness at night, loss of appetite, nocturia three or four times, slight frequency. Has a history of hematuria once within that period. **Physical examination.** Redness and tenderness with some edema of outer and under side of both thighs and buttocks. **Temperatures** normal at entrance. **White blood cell count** 48,000. **Urine** bloody acid, small trace of albumin, sediment much blood, few cell-casts, moderate number of leucocytes. Patient began to run, septic temperature which reached 102 became unconscious and died fifth day. **Clinical diagnosis.** Erysipelas.

Autopsy 19 1/4 hours post-mortem. Anatomical diagnosis. Suppurative nephritis with infarcts of the kidney; subcutaneous glomerular and chronic interstitial nephritis, suppurative prostatitis, septicurulent peritonitis, soft pleural mural thrombi in the right auricle and the right ventricle, thrombi in the right common iliac and right femoral veins, arteriosclerosis with small secondary aneurysm of the left coronary artery, hemorrhagic edema of the inferior lobe of the left lung, streptococcus infection.

Kidneys. Capsules free. Surfaces show numerous minute yellow points. The glomeruli do not

appear to be abnormal. On section, the areas above described are found to extend through the cortex and into the pyramid in some cases as grayish yellow lines. Bladder and ureters not remarkable. Prostate shows numerous small abscesses.

Microscopic examination In many places the interstitial tissue of the kidneys is increased in amount over small areas and there is atrophy of the renal element and round-cell infiltration. In a good many tubules pus cells and necrotic desquamated epithelial cells are present. In one section two abscesses are observed. The capillaries of some of the glomeruli contain leucocytes. In a minority of the glomeruli there are vesicular nucleated cells closely packed together which are proliferated epithelium of the glomerular capsules. There is considerable oedema of the interstitial tissue.

Bacteriological report Cultures from the heart blood no growth. Cultures from the liver and spleen profuse growth of bacteria mostly staphylococcus.

Sections stained for bacteria Staphylococci among which are some chains of streptococci are found in the small areas of suppuration. There are also a few bacilli.

CASE 56 Autopsy No 1505, East Surgical 522-119 Male age 60 September 19 1905 *Past history* Gonorrhoea 47 years ago. Stricture 16 years later operation division of stricture at that time. *Present illness* Admitted with retention. Urine acid slight trace of albumin, much pus. *Temperature* normal. *Operation* Perineal section. Twenty days after operation developed temperature and symptoms thought to be right pleurisy; patient refused nourishment began to vomit had partial suppression of urine and died on the forty-sixth day. *Clinical diagnosis* Stricture of urethra.

Autopsy 33 hours post mortem Anatomical diagnosis Stricture of urethra penile sinus, slight hypertrophy of prostate hypertrophy of bladder with diverticula and cystitis diphtheritic ureteritis pyonephrosis diphtheritic pyelitis and suppurative nephritis on the left senile atrophy of right kidney hypostatic pneumonia.

Kidneys Left renal pelvis and calices dilated and filled with foul thick fluid. Adherent to the walls of the calices and pelvis is a grayish pink membrane. The capsule of the left kidney is adherent surface is extremely granular. Here and there on the surface are whitish slightly elevated areas 2 to 3 millimeters in diameter containing pus. The cortex is thinned. The right kidney shows slightly adherent capsule. The pelvis of this kidney is slightly enlarged otherwise negative. The right ureter is negative.

No microscopic examination of the kidney is recorded no autopsy cultures.

Sections stained for bacteria No kidney tissue was preserved, section of prostate used. The millary abscesses in the prostate show staphylococci a few chains of streptococci and many bacilli.

CASE 57 Autopsy No 119, West Surgical 465-67 Male age 40 March 15 1904 *Present illness* Fracture of vertebra of twenty four hours standing. Urine on entrance small trace of albumin, a few finely granular and epithelioid cell-casts leucocytes. *Operation* Laminectomy. No other urinary examination recorded. From entrance patient ran an increasingly high temperature and died twentieth day. *Clinical diagnosis* Fracture of dorsal vertebra.

Autopsy 2 hours post mortem Anatomical diagnosis Fracture first lumbar vertebra crushed cord operation wound — laminectomy, septic wound meningitis abscess of right lung double empyema abscesses of kidney and prostate cystitis Pott's fracture of left leg streptococcus septicaemia.

Kidneys Combined weight 365 grams. Capsules easily removed revealing small abscesses on the surfaces of both kidneys. In places these abscesses extend a distance into the cortex and in a few instances as streaks as far as the tips of the pyramids. The kidneys are not dilated ureters are free. The bladder presents an ecchymotic gray red mucosa. The prostate shows an abscess 3 centimeters in diameter of the right lobe.

Microscopic examination Sections of the kidney show abscesses.

Bacteriological report Cultures from the heart liver and spleen show staphylococci and streptococci. Cover glass preparations from the pus in the wound show streptococci. *Sections stained for bacteria* Abscesses in the kidney tissue show clumps of streptococci and staphylococci. In one abscess there are two large masses of bacteria one of which seems entirely a streptococcus infection the other entirely a staphylococcus infection.

CASE 58 Autopsy No 1731, West Medical 644-161 Female age 32 June 30 1906 *Past history* Four years ago post-puerperal sepsis. *Present illness* One week ago began to have recurrent attacks of chills without other symptoms. Patient came to hospital in prostrated condition high temperature pulse and respiration. Urine very slight trace of albumin moderate number of red blood and pus-cells. *White count* 13 000. Patient continued to grow worse and died fourth day. *Clinical diagnosis* Septicæmia origin unknown.

Autopsy 19 hours post mortem Anatomical diagnosis Malignant endocarditis of mitral valve bronchopneumonia, purpura hemorrhagica in facets of spleen and kidneys suppurative nephritis septicæmia staphylococcus pyogenicus aureus early pregnancy and abortion.

Kidneys Combined weight 339 grams. The capsules strip easily leaving a dark reddish surface dotted over with minute yellow points, dark red spots and here and there small irregular confluent abscesses. The small yellow areas mentioned are seen to be the outer surface of fairly firm homogeneous masses surrounded by blackish red kidney tissue from which they are sharply marked off. In

some places these infarcts are situated in the cortex, while in others a few extend from the bases of pyramids to the cortex. In the pyramids are to be found numerous yellow streaks and spots. The cortex measures 5 to 6 millimeters. The m. cosa of the pelvis shows minute blackish red spots. Ureters and bladder normal save a few ecchymotic areas.

Microscopic examination. The kidneys show necrosis with abscesses and hemorrhage.

Bacteriological report. Cultures from the heart blood and spleen show pure growth of staphylococcus pyogenes aureus. Sections stained for bacteria show in the discrete abscesses mixed infection of streptococci and staphylococci. In many places the vessels are found plugged with bacteria most of which are streptococci, although all were found to contain considerable numbers of staphylococci.

CASE 50. Autopsy No. 108. South Surgical 70-97. Female, age 61, June 26, 1903. *Present illness.* One week of acute abdominal pain with high fever finally localizing in the gall-bladder region. *Urine* neutral reaction trace of albumin occasional blood and pus-cells, no casts. *White blood count* 80,000 *temperature* varied from 100 to 104. Patient was not operated on and died of sepsis on seventh day. *Clinical diagnosis.* Cholelithiasis, cholecystitis, suppurative epiphritis.

Autopsy 44 hours post-mortem. Anatomical diagnosis. Pyonephrosis, pyelonephritis, cholelithiasis, icterus, fibromyoma of the uterus.

Kidneys. Left kidney is apparently normal right kidney is enlarged, and its capsules strip leaving smooth surface dotted here and there with minute yellowish abscesses. On section the tissue is soft and section surface shows numerous milky purulent areas. The cortex is of good width the pelvis is dilated and contains yellowish brown, foul, purulent material. Ureters and bladder show nothing remarkable.

Microscopic examination. Sections of the kidney show the usual appearance of pyelonephritis. Sections of the left kidney show only edema.

Bacteriological report. Cultures from liver and spleen show accumulation of growth of bacilli.

Sections stained for bacteria show considerable numbers of gram-negative colon-like bacilli in the arteries and in some of the tubules while a considerable number of a smaller gram-positive bacilli are to be found in abscess areas.

CASE 60. Autopsy No. 185. East Surgical, 338-6. Male, age 80, June 14, 1903. *Present illness.* Patient admitted for retention. Could give no information about himself. *Temperature* 100 vomiting, died soon after entrance. *Clinical diagnosis.* Enlarged prostate.

Autopsy 9 hours post-mortem. Anatomical diagnosis. Adenoma prostate, diverticulum bladder slight dilatation ureters, suppurative nephritis arteriosclerosis, senile emphysema lungs, papillary adenoma kidneys.

Kidneys. Capsules somewhat adherent. Cortex of each kidney somewhat narrowed. Kidney tissue

pale opaque and soft. A few small abscesses beneath the cortex (Fig. 32). Cultures of the heart blood show no growth. Cultures from the kidney show several varieties of cocci and bacilli which are not differentiated.

Microscopic examination. Kidney shows in the cortex extensive areas of infiltration of leucocytes with some disintegration of the renal epithelium. Glomeruli are not remarkable. Arteriosclerosis of the vessels, some areas of fibroid atrophy and round cell infiltration.

Sections stained for bacteria. The predominating organisms in the abscess cavities are two types of bacilli one gram negative bacillus probably bacillus coli, the other long barred gram positive bacillus.

NOTE.—These two bacilli clearly seem the etiological factors in the production of suppuration although occasionally cocci are found. This case shows considerable post-mortem sepsis which may explain the presence of the variety of organisms found yet the occurrence of the two bacilli described above in large numbers and confined to abscess cavities seems to indicate that they are the etiological factors.

THE LESIONS OF SO CALLED ASCENDING INFECTION ARE HISTOLOGICALLY INDISTINGUISHABLE FROM THE EXCRETORY TYPE OF LESION

It has been customary to assume that there was a definite lesion produced in the kidney by ascending infection. This is referred to again and again in the literature and is often spoken of as the typical lesion of ascending infection. That this distinction cannot be maintained appears to us to be conclusively shown by the two following cases (32 and 33). Without reproducing here the whole evidence printed above we may note that Case 32 was that of a man whose urine was normal at the time of entrance to the hospital. Following operation for cancer of the stomach retention of urine took place and he was catheterized regularly until the day of his death three weeks later. During the process of catheterization pus appeared in the urine and the case is typical of those generally credited with being ascending infection. Case 33 was that of a woman interestingly enough of exactly the same age who died two weeks after an operation for fibroma of the uterus followed by infection of the wound. This patient had no urinary infection at the time of entrance was not catheterized during her stay in the hospital and at autopsy showed a normal bladder. Nevertheless the lesions of the

kidneys in these two cases are indistinguishable as a glance at the illustrating figures will show. These cases are typical of several occurring in our experience and we think they are sufficient to require an abandonment of the belief that there is any lesion of the kidney typical of ascending infection.

THE BEARING OF THE ABOVE OBSERVATIONS UPON THE DIAGNOSIS OF RENAL INFECTION

If we have succeeded in establishing the fact that the pyogenic organisms produce lesions of the kidney essentially different from those produced by nonpyogenic organisms it follows that this fact has an important bearing upon diagnosis. In the first place it has, we think, been abundantly demonstrated by the testimony of many observers that organisms concerned in renal infection appear promptly in the urine though they may not long continue to so appear. That organisms not concerned in renal infections may also appear in the urine is to be remembered. The evidence above referred to of the appearance of tubercle bacilli and lepra bacilli after the administration of salvarsan, the recent observations of William H. Smith in regard to the appearance of organisms in the urine of patients with fever probably caused by a septicaemia and a mass of extremely careful evidence all bear upon this point.

On the other hand with clinical evidence suggesting a renal infection the diagnostic importance of a careful examination of the urine can hardly be overestimated. Thus the lesions characteristic of pyogenic organisms will show the bacteria in the urine perhaps only during the early stages. Since however these lesions are comparatively shut off from the lower portions of the kidney and as they do not involve the pelvic mucous membrane pus in any considerable amount will be found rarely if at all. By the same token since the lesions of the nonpyogenic group are produced chiefly in the renal pelvis evidence of this fact is abundantly clear in the urine by the early production of pus accompanying the appearance of the microorganisms.

A very striking difference is also to be ob-

served in the effect on kidney function as measured by phthalein in these two types of infection. Since the suppurative infections involve chiefly the cortex and comparatively little the convoluted tubules they would be expected to produce comparatively little effect upon kidney function thus measured and such is in fact the case. On the contrary the chief lesion of acute renal infections with the colon bacillus group is not upon the convoluted tubules the pelvic lesion though appearing early being we think secondary to the tubular lesion. This should and in fact does produce sudden and profound changes in kidney function the case described on p. 498 being but one of a considerable series of observation which we have previously discussed in a paper on "Ilelo-nephritis." Briefly and somewhat dogmatically stated therefore the diagnostic evidence is as follows. If with clinical evidence suggesting a renal infection freshly drawn urine studied as suggested by Crabtree shows cocci in abundance with a small amount of albumin a few red blood corpuscles and many leukocytes or a little pus together with a renal function at or near normal limit a diagnosis of coccus infection of the kidney is justified. If on the other hand a similar examination shows many bacilli a little albumin and much pus coupled with a markedly diminished kidney function a diagnosis of colon bacillus infection of the kidney is unavoidable.

Though it is foreign to the title of this paper it may not be improper to suggest the bearing of these observations upon treatment. Clearly the suppurative lesions concern those portions of the kidney which are relatively inaccessible to drug and if these lesions are such as to require treatment that treatment must be operative. On the other hand the lesions produced by the colon bacillus group concern those portions of the kidney relatively accessible to formaldehyde containing drug and the surgeon is therefore justified in persisting in treatment by this method on the assumption that if it be properly planned and efficiently carried out

it will succeed in controlling the infection. This statement must not be assumed to mean that we believe that the formaldehyde containing drugs act upon the cells of the convoluted tubules. Thus we have no reason to assert, but the lesion of this portion of the kidney is a very transient one and such damage as is done by the acute process is rapidly overcome by the restorative action of the cells themselves. This particular lesion does not require treatment. It is the lesion of the pelvis and to some extent of the lower urinary tract that is the persistent and dangerous lesion, and this can be reached by formaldehyde.

NOTE.—W. wish to express appreciation of the valued services of Dr. James Homer Wright director of the laboratory for lively interest in the work and for aid in collecting material. W. have appreciated the privilege of appealing to his judgment on difficult questions arising during the progress of the work.

Dr. Oscar Richardson has kindly supplied from the autopsy room much valuable material.

Dr. William H. Smith has offered many helpful suggestions on the staining of bacteria in tissue.

Whatever of unusual merit our microphotographs may show is due to the painstaking thorough work of M. L. S. Brown.

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CABOT AND CRABTREE NON-TUBERCULOUS RENAL INFECTIONS

- [illegible]

THE BASTEDO SIGN IN CHRONIC APPENDICITIS

B. JACOB ROSENBLUM M.D. PH.D. PITTSBURGH

IN 1911 Bastedo (1) described a new test for chronic appendicitis. It consists in passing a colon tube eleven to twelve inches into the rectum and injecting air by means of an atomizer bulb. He found that as the colon distends, pain and tenderness to finger point pressure becomes apparent at McBurney's point, if appendicitis is present. Dreyer (2) Rost (3) Slawinski (4) Hertz (5) Goodman and Lueders (6) and Bischoff (7) have described their experiences with this test.

Bastedo, Hertz, Dreyer and Bischoff consider colonic inflation of great value as a diagnostic sign of chronic appendicitis. Rost, however, claims that Bastedo's sign is positive not only with diseases of the appendix but also in pathologic conditions in the colon. Rost also says that the pain appears only if there are changes in the mesenterium which brings the appendix into a certain abnormal relation to the cecum, however. Bischoff on the contrary has found the test positive when the mesenterium was entirely normal and the appendix alone was diseased. In the cases that he examined after operation, there was no longer the slightest pain in the appendix region when the colon was distended.

Goodman and Lueders however claim that there is no constancy in the results obtained with this test, and it is in no sense pathognomonic of chronic appendicitis. They have seen no positive reactions in normal individuals.

I have personally been using this test, ever since its description by Bastedo and have found it of great service in the diagnosis of chronic appendicitis as may be readily noted by the accompanying tabulation of cases studied.

Case No.	Clinical Diagnosis	Bastedo Sign	Operative Findings
1	Normal	Negative	
2	Normal	Negative	
3	Normal	Negative	
4	Normal	Negative	
5	Normal	Negative	
6	Normal	Negative	
7	Normal	Negative	
8	Normal	Negative	
9	Normal	Negative	
10	Normal	Negative	
11	Chronic appendicitis	Positive	Chronic appendicitis
12	Chronic appendicitis	Positive	Chronic appendicitis
13	Chronic appendicitis	Positive	Chronic appendicitis
14	Chronic appendicitis	Positive	Chronic appendicitis
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98	Chronic appendicitis	Positive	Chronic appendicitis
99	Chronic appendicitis	Positive	Chronic appendicitis
100	Chronic appendicitis	Positive	Chronic appendicitis

I am convinced that this sign is of great value in the diagnosis of chronic appendicitis.

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SOME OBSERVATIONS CONCERNING POST-OPERATIVE COMPLICATIONS OF THE LANE SHORT CIRCUIT AND COLECTOMY

BY R. L. SMITH, M.D. LOS ANGELES, CALIFORNIA

THE intestinal work of Sir Arbuthnot Lane has been widely criticized in this country with varying degrees of justice depending upon the knowledge of the writer or speaker upon the subject and his experience in dealing with these cases.

If it be possible to summarize the opinion of surgeons on the subject of relief of intestinal stasis by surgery, I would say that it can be expressed in this: There is no doubt that certain cases are greatly relieved of their symptoms of intoxication by one of the Lane procedures but the result of the operation is too often spoiled by complications which arise from the surgery itself.

In this paper I shall take up separately the complications that seem to be peculiar to this particular type of surgery and attempt to point out the reasons for their occurrence and the logical way to avoid them.

In ileocolostomy the one great fear of American surgeons has been the backing up of feces into the blind pouch of the cecum necessitating secondary colectomy. Lane's records in 1912 showed that this complication happened in 20 per cent of his own cases and that he was unable to foretell in which case it might be expected. A more careful consideration of the *physiology* of the colon will show that the remedy for this the greatest bugbear of the short circuit lies not in finding some method to prevent the ileal content from going back into the cecum but in assuring this content a free outlet after it has backed up. The ileal content in all successful short-circuit cases backs up into the blind pocket and the only ones that become impacted are those with a partially obstructed colon from which the solid residue cannot return.

It has been repeatedly shown by the X-ray that any fluid thrown into the terminal segment of the large bowel will be carried immediately into the cecum by reverse peristaltic waves. Here the fluid is absorbed and the

so-called normal peristaltic waves carry the more solid content back to the lower segment or container. This is precisely what happens after a short circuiting operation and there will be no difficulty with fecal impaction as long as the colon is unobstructed. A simple short circuiting operation in the obstructed case will not only be of no service but is distinctly contraindicated. Either the obstruction must be relieved or the colon removed to the point of obstruction at the time of anastomosis or an impacted cecum will result.

To my mind the most serious complication is that of unusual post-operative adhesions which by contraction cause obstruction varying from slight narrowing to complete cutting off of the bowel. Symptoms from these adhesions are usually not apparent for several months after operation although I have lost one case from acute obstruction in the third week of an apparently smooth convalescence. These adhesions are peculiar in that they are usually in patches and are the result of local peritonitis in widely separated parts of the abdomen. These constant patches of peritonitis are due to direct infection at the time of operation because of technical error in the arrangement of the steps of the Lane operation used almost universally by American surgeons. In making the anastomosis the infected thread which sews through and through the colon wall is handled by the surgeon touches the gauze packs and renders the whole field unsterile after which the patient is eviscerated and the split in the mesentery stitched. In spite of the most scrupulous care on the part of the surgeon it is impossible to prevent some infection at this time and the handling of the whole abdominal contents in moving the small intestine to the upper abdomen is accountable for the wide distribution of the infection. As Lynch has suggested it is a safer, urged procedure to sew the mesenteric

before the anastomosis is done and it is also safer to make the opening and sewing of the colon the last step in the operation, at which time the field must be considered infected, and the same care exercised to prevent the distribution of infection as is customary in operating in a recognized infected field.

The technique of intestinal anastomosis has been largely influenced by the development of the technique of gastro-enterostomy where it has reached its highest point of perfection. This technique however efficient in the comparatively uninfected upper abdomen, cannot be used in anastomosis of the colon or terminal ileum, where the contents are highly infected. The wide application to all parts of the intestinal tract of this simple and effective method of sewing is responsible for the great preponderance of post-operative adhesions which are prone to follow all operations entailing the opening and sewing of the lower bowel.

Experience has shown that late in the convalescence alarming symptoms develop in the cases in which a partial or complete colectomy accompanies the intestinal anastomosis. This occurred in my work until I properly appreciated the importance of the *physiology* of the parts removed and adopted a very simple routine of supplying fluid to the patient before it became evident that it was necessary. In six consecutive partial colectomies since that time I have not seen any untoward symptoms develop. Lane gives a large quantity of saline solution under the skin while the patient is on the table and repeats it later if the patient shows signs of needing fluid. Although I followed Lane's rule, my early colectomy cases all became dehydrated, developed rapid pulse, nausea, vomiting and in most cases acute dilatation of the stomach. Their condition was more alarming from the fourth to the eighth day than immediately following operation—the reason is obvious. About 65 per cent of all the fluid intake of the body

is absorbed by the cecum and ascending colon. The sudden removal of this filter leaves the patient unable to pick up water until the left side of the colon has taken up the work—usually from six to ten days. If the patient during this time be given salt solution under the skin *daily* the convalescence will lose all its terrors and become that of any major abdominal operation.

The importance of the choice of cases to be operated upon and the choice of operation in each individual case cannot be overestimated. Improper selection of either is sure to be followed by defeat in obtaining the desired symptomatic results, as well as by post-operative complication, which would be attributed to the surgery itself. Ileocolostomy is designed to relieve a stasis in the ileum—the result of an obstruction preventing the free passage of its contents to the cecum. This has nothing to do with colon stasis or constipation and if a simple short circuit be done on a patient with constipation, a secondary colectomy will probably have to be done for impacted cecum. We should not expect to cure a mechanical difficulty in the large bowel with an operation designed only to relieve a mechanical difficulty in the small bowel. If a patient suffering from toxemia from the *small bowel only* becomes a surgical case I believe that the simple Lane short circuit is the operation of choice and I am sure it can be done with safety if the simple precautions against adhesions mentioned above are followed. If as is usually the case, the obstructed ileum is accompanied by a dilated cecum, which has lost the power to empty itself normally the Mayo right-sided colectomy is, to my mind the operation of choice. The technique as developed in the Mayo clinic is free from the criticism of the Lane technique in that the intestines are not handled after the colon has been opened, and thus the possibility of infection is greatly lessened.

CIRCULAR CONSTRICTION IN THE TREATMENT OF FRACTURES OF THE LONG BONES

By F W PARHAM MD FACS NEW ORLEANS

AT the meeting in December 1912 of the Southern Surgical and Gynecological Association Mr Milne of the London Hospital showed a device for the fixation of fractures of the long bones. This consisted of a metal band with a screw thread its whole length along which a nut was made to move by means of a spanner as shown in Fig 1 *a b d and e*. The band is thrown about the bone the one end passed through a loop at the other end and the band tightened by the spanner until the fragments of bone are held in place when the nut is fixed and the band cut off.

I was so much struck with this device that after getting back home I began to experiment to see if the apparatus could not be somewhat simplified. My aims were two first to find the best and simplest material to place about the bone and second to make as simple as possible the device for tightening the constrictor band. The second part of the apparatus was first elaborated on the principle of the *écraseur* or the wire snare. The constricting material was not so easily settled upon. I first tried silver wire doubled so as to form a loop at one end. The loop end was to be passed about the bone the free end

carried through the loop and a perforated shot slipped over the wire. This being attached to the tractor was easily drawn up and tightened by turning the traction screw and made as snug as desired about the bone. As the wire was tightened the shot was of course driven against the bone immediately over the loop and there mashed against it. This appeared extremely simple and theoretically seemed likely to answer all expectations. However in practice something always went wrong. We afterward twisted the wire which seemed especially to adapt it to holding

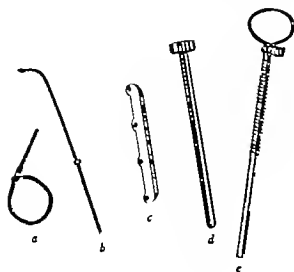


Fig 1 *a b c d e* Mil Instrument

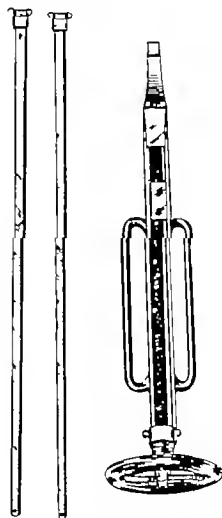


Fig 2 Putt's Apparatus.

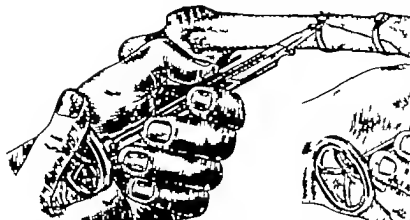


Fig 3. Putti instrument showing band tightened and about to be carried over and caught between the lateral ends.

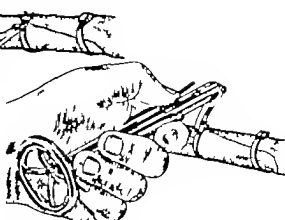


Fig 4. Putti instrument showing tightening of band. Upper band tightened and in place.

itself in place about the bone but it was found that when sufficient force was put upon the wire to tighten it either the wire broke or cut through the shot, so that the constriction was lost. We experimented with different kinds of wire—copper, aluminum, and bronze—but found none answered the purpose. Dr. Martin suggested a steel band with a slit in one end expanded so as to make room for the other end to be slipped through. A hole in the other end made it easy to attach it to a pin near the end of the screw rod which was drawn up by turning the wheel at the other end.

After various modifications in the perfecting of which we were cheerfully assisted by our instrument makers, the apparatus as finally elaborated and sold to the profession is represented in Fig. 8.

I showed the apparatus before the American Society of Clinical Surgeons which met in New Orleans in March, 1914 and presented a femoral fracture treated with two bands. Dr. Martin shortly afterward applied two bands to a fracture of the tibia, holding the fragments so firmly in place that they were not displaced when in a delirium the following night the man got out of bed and walked about the ward (Figs. 10 and 11).

Dr. Lund, of Boston asked me to send him one of the instruments shortly after this meeting and was able to report at the recent meeting in Washington of the American

Surgical Association 30 cases thus treated. He applied the bands in Boston last October before the Clinical Congress of Surgeons of North America, taking X-ray pictures of the cases immediately afterward showing the fractures reduced and the bands in place.

Dr. Matas recently called my attention to an article on a new method of osteosynthesis by Professor v. Putti published in *La Clinica Chirurgica*. In this article Professor Putti gives a history of metallic ligatures in the treatment of bone fractures and describes an apparatus of his own which he had employed with success. Cuts explain the apparatus fully. It will be observed that there is a striking similarity between this apparatus and the Parham and Martin device.

I did not know of his work until May 1, 1916 when Dr. Matas called my attention to it as above stated. The suggestion of the Parham and Martin apparatus was derived as mentioned in the beginning of this paper from Mr. Robert Milne of London. He subsequently showed his instrument and made

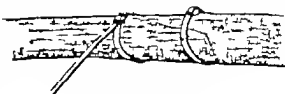


Fig 5. Putti bands applied.
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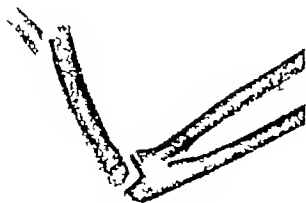


Fig. 6. Fracture of humerus (Putti).

some remarks upon its use at Murphy clinic in Chicago. The remarks and cut are published in *Murphy's Clinics* for April 1913 to which I am indebted for the illustrations of the Milne apparatus here given.

The Parham and Martin bands are intended for oblique fractures. If it is desired to apply them for a transverse fracture a plate or the girder of Mr. Souttar shown in Fig. 1 c and two bands would have to be employed. This girder is a metal plate about a half inch wide bent along the middle parallel to its length to a little less than a right angle. A longitudinal slit is made in the fragments while held in apposition and one edge of the plate driven in until the other lies flat on the bare surface. The band or two bands are then applied or the plate may be held in place by two or more screws.

The article of Putti is so interesting that I shall give here an abstract of it prepared from a translation kindly made for me by Dr. Graffagnino of New Orleans.

The metallic ligature, one of the oldest methods of uniting bones, should not be confused with the metallic suture which is limited in its application and should be definitely abandoned. The metallic ligature is based, he thinks, on correct principles and should be considered the method of election for



Fig. 7. Band applied to the patient's arm.

all fractures of the extremities, oblique and overlapping.

It has been cut many times, the use of various positions and is which is held about the bone by twisting together the ends.

The result depends on two factors:

1. Quality of material.

Manner of employing it.

Silver has been most used but is not as strong well because it breaks easily. Bronze aluminum is better because of its tenacity and resistance to oxidation but it is not very malleable. In Putti's opinion that advocated by Lambotte is best. This is a gold or silver plated copper wire.

The objection to wire is:

1. The wire being cylindrical does not adhere well to the bone.

Fixation by twisting the ends together results in breaking the wire at the critical moment.

Putti was unable to overcome this objection so he finally turned to the metallic band, tightening it about the bone somewhat after the manner of a slip-knot. The tightening is done by a band lever which is illustrated in the accompanying illustration (Figs. 2 to 5).

The band is composed of an alloy with a bronze base. It varies in width and thickness according to need. The 2.5 and 6 millimeter width has been most used.

From the cut it appears that the inner cut lies the band which is drawn up gradually by the long screw worked by the wheel at the other end. The required tension being obtained the handle is carried forward bending the band through an arc of about 90° when it is cut off and the instrument removed. To avoid irritation of the tissues the band is armed between the two metallic ears just beyond the bridge of reflection through which the band has been passed (Figs. 2, 3, 4, 5, 6 and 7).

It will be observed that Putti's instrument is more complicated and cumbersome than the Parham and Martin apparatus requiring, as it does a loop for making the slip knot and

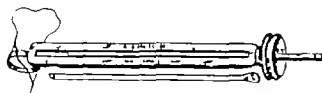


Fig. 8. Parham and Martin instrument and band.

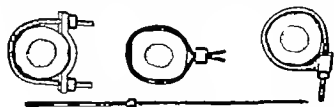


Fig. 9. Professor Lambotte's apparatus (Putti's).



Fig. 10.

Fig. 10. Dr. Martin's case.
Fig. 11. Same case with two bands.

Fig. 11.



Fig. 12.



Fig. 13.

two lateral ears just beyond to hold the band in situ.

In our instrument there is nothing but a slit in the expanded end through which the other end is passed. The tension of the band when tightened is sufficient to hold it in place.

The band is of steel with a sufficient percentage of carbon to give it just the right degree of rigidity. The width varies from 3 to 5 millimeters.

It will be seen from a comparison of the two instruments that ours is decidedly simpler, being a simple band passed through a slit and clamped by simply holding it down flat. To cut it off requires only that it should be held fast by a chisel while the tractor is wiggled to and fro a few times, when the band breaks readily. It is then driven down flat by a few taps of the mallet on the chisel pressed against it. The instrument is so simple that the whole operation may be completed without once touching the wound (Figs. 8, 10, 11, 12 and 13).

Dr. Lund has devised a simple instrument for passing the band and we have used a needle like a large aneurism needle which answers well. The band itself is easily passed

Fig. 12. Parham's case of oblique compound fracture, May 3, 1906.

Fig. 13. Band applied June 3, 1906. The band was subsequently removed owing to some irritations, though slight occurred. Healing has been satisfactory.

without any aid in some cases, but generally speaking it is difficult to do this as the band is not well adapted to moving about a cylindrical bone surrounded by dense fibrous tissues, such as those attached to the linea aspera of the femur or the interosseous membrane of the tibia.

Mechanically this band method is extremely simple and effective. I have not intended to discuss the question whether as W. P. Carr of Washington, asserts it really violates an essential principle in the treatment of fractures and actually interferes with callus formation. A most elaborate investigation published in the *British Journal of Surgery* has led Mr. Hey Groves to conclude that in dogs and cats it does inhibit the development of external callus under and over the circular band, but the work of Dr. Lund which has been more extensive than Dr. Martin's and mine, seems to show that practically the objection does not hold.

THE PARHAM AND MARTIN BAND IN OBLIQUE FRACTURES

WITH REMARKS UPON MECHANICAL APPLIANCE VERSUS BONE CRAFTS

BY F. B. LUND, M.D., FACS, BOSTON

AS we gain further experience and skill in the operative treatment of fractures we are more and more able to make an intelligent choice of the cases which should be operated upon early to operate more skilfully and take better after care, thus avoiding the painful necessity of operating late upon the bad results of those fractures which have received the so-called conservative treatment.

In fractures of the femur—particularly those cases in which the old Buck's extension treatment entailed for the patient so much discomfort and so long confinement in bed (three to six months) and for the surgeon so much care and constant adjustment of the apparatus—have our results been more satisfactory and the method of obtaining them more easy and comfortable both for the patient and the surgeon.

In cases of transverse fracture of the femur, especially those where repeated attempts fail to bring the ends into apposition and in which X-rays show the ends overlapping or perhaps actually separated by a clear space, interposition of soft tissue, is the operation indicated. We gain by operation with firm internal fixation: (1) the knowledge that the ends of the femur are in perfect position; (2) the ability to hold them there by fixation in a plaster-of-Paris dressing; (3) the power to bid farewell to the cumbersome unsatisfactory and trying extension methods. We can also practically ensure for our patient a perfect anatomical result without shortening.

The long plates with six or eight screws offer very good fixation in femur fractures, but the length of the limb and the power of the muscles are so great in proportion to the strength of the plate that without firm long continued external fixation a slight springing of the ends may take place, the screws gradually loosen and pull out and marked bowing or actual displacement of the ends occur resulting in failure. Of course, experience has

by this time brought us to use wood-screw and to fit them tightly in the screw hole, but even with adequate technique fixation by plate and screw is not absolutely satisfactory and long and careful immobilization is necessary.

Even though in plating our results are better than with the old method and our deformities less, union is not much more rapid and in fact some (Martin) have claimed that it takes place more slowly and I think he is right.

In oblique and comminuted fractures we have a method of fixation which is simple, rapid, mechanically effective and get union in a comparatively short time. I refer to the steel band devised by Parham and Martin of New Orleans.

Oblique and spiral (or uncomminuted) fractures are perhaps more frequent than transverse. Transverse fractures are produced when the fracturing force is applied at right angles to the bone, as when a man in an automobile accident is thrown sideways against a telegraph pole. Oblique and spiral fractures occur when the force is applied nearly in the longitudinal axis of the bone, as in falls from heights striking upon the feet, especially if the body be twisted so as to produce rotation. Sheerness of the application of force tends against transverse and for spiral fracture. If we wish to break a stick transversely we pull it sharply across the knee. If we wish to splinter it we stand it on end and hit it with a mallet or twist it holding one end in each hand. It seems possible that a majority of fractures of the shafts of the long bones are more or less spiral or oblique, at least we use the bands nowadays full as often if not oftener than the plates. An obliquely fractured bone may be compared to a broken fishing rod; the rod always breaks obliquely with a splintered fracture and the effective way to mend it is to wind it with waxed thread, thus bringing the fractured surfaces in apposition and holding



Fig. An oblique fracture of the femur, banded 1 year ago, in child, aged four years. A (left), anterior view showing band embedded in the femur and entirely covered by new periosteal bone. B, lateral view showing that here the bone has not entirely embedded the band.

them firmly. The same principle is applied to bone by the Parham band. The bone if outside the body might be wound with copper wire as a fishrod is with thread and the result would be excellent. But this would take much time and cause much trauma in operating through a deep incision in the muscles of the thigh. A single wire passed once around the bone would not give firm enough apposition and would be likely to cut its way quickly into the cortex so as to be too rapidly loosened.

The bond of Parham and Martin is wide enough so that one or at most two of them passed around an oblique fracture give effective support and they can by means of the band placer be carried quickly around the bone and fixed as quickly as a wire can be twisted. The rough oblique-fractured sur-

faces are firmly held together and the fragments evidently much more firmly supported than are the transverse fractures by a bone plate. The strain on the plate is transverse and sometimes breaks it. The strain on the band is longitudinal; it never is broken after it is once in place. The firm apposition of the rough surfaces of bone prevents slipping, twisting and springing. Union takes place quite rapidly and motion may be allowed several weeks earlier than with the bone plate. The band is wide enough so that it does not cut in and thus become loosened. It is simpler of application than the plates and screws as it requires no drilling of the bone, accurate fitting of screws or careful use of screwdrivers and drills. The one advantage in the plate and screws is that one does not always have to clear the soft tissues off clear around the bone but can grasp the ends with heavy forceps and drill and put the plate in without clearing the soft tissues off the posterior surface of the bone. This is an advantage in the femur because the *linea aspera* is difficult to clear and it is there if anywhere that we get hemorrhage while in the tibia we must avoid the *interosseous* membrane and the occasional injury of the posterior tibial which may take place if we carry instruments carelessly around behind the bone. This slight disadvantage is not to be weighed for an instant in the oblique cases however against the other advantages of the bands. A very clever instrument has been devised by Dr. Duff of Boston which may be passed around the bone while hugging its posterior surface and with the minimum of trauma and separation of soft parts which in my hands has greatly facilitated the passing of the bands. They may thus be quickly and simply applied. In spiral fractures with comminution the band holds the separated piece firmly in its position between the main fragments of the shaft or if one band (as is rarely the case) does not accomplish this effectively two will certainly do so. For these cases before I knew about the bands I formerly used a plate and wires.

In our hospital we have a good many oblique fractures of the femur in children and three years ago I began to use the band on those



FIG. 1. Ankle fracture with hip in. (Ht. 41)

After banding and plaster-of-Paris fixation the patient have been surprisingly comfortable and the great advantage has been that no adjustment of apparatus has been required. After four weeks the plaster can be taken off and after living in bed a week the little patient get up on crutches and very soon are running about. The result in these cases have usually been perfect. When we first began to use the bands we were warned by various surgical wiseacres that in these children as the bones grew the bands would cut in and girdle the bone and that fracture would result or that the band would cut off the nourishment from the distal portion of the bone and prevent its growth, comparison being made to girdling a growing tree by a wire tight enough to cut off the flow of sap and kill it. But the blood and lymph which nourish a bone do not flow straight up between the periosteum and bone as does the sap between the bark and wood of a tree from bottom to the top or the root to the branches. The periosteum from which the surface of the bone is regenerated is nourished by blood vessels from all side which are not cut off by the band and the marrow is nourished by the branches of the nutrient artery which as it is protected by bony wall is not compressed or cut off by the band. None of my children who have had their femur encircled by bands has suffered sub-

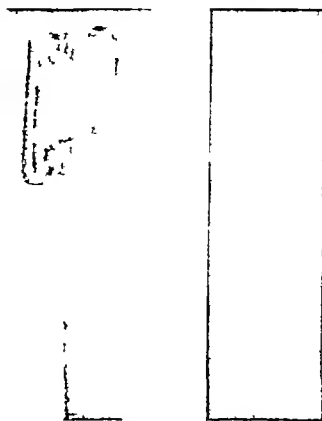


FIG. 2. Oblique fracture of femur with ankle in. (Ht. 41). Same fracture treated by the band. This fracture would have been tremendously difficult to treat by extension with the ankle with the bone well fixed. The boy was walking on the leg in seven weeks.

sequent fracture and I am fortunate enough in one case to be able to present an X-ray photograph (Fig. 3) of a femur in a child aged four years about which a band was placed two years ago. The picture shows the femur slightly widened at this point and the band included in the shaft of the bone which has grown over it. In time it must happen that the band is shut up or enclosed in the bone and how it can cause irritation when firmly fixed in rigid tissue is difficult to see.

The question may fairly be asked why we have not undertaken the intravascular bone graft method in these fractures in order to do away with foreign bodies and employ nothing but normal bone tissue for fixation.

The answer is that we have felt that in fractured femurs the muscle wound is necessarily so deep that it would be a difficult job to saw out the graft and that the use of the band is so simple and easy a comparison with the other that in fresh fractures one would



Fig. 3. A (left). Oblique fracture of lower end of femur in woman aged about three years. The difficulty of adequate treatment by skeleton in this case is evident. B same case treated by band. There is rapid and successful recovery and good function.

hardly be justified in employing the latter method. The inlay bone graft also is obviously much better adapted to transverse than oblique fractures.

Fresh cases of fracture of the tibia of transverse can usually be brought into apposition without operation in fact they are usually the result of direct violence applied in a transverse direction and the tibia keeps them in place. In the much commoner spiral fracture the line of the fracture does not favor the inlay graft while the band holds the surfaces in perfect apposition and must give a firmer support than would the inlay graft. An inlay graft would obviously be much easier to saw out in the subcutaneous surface of the tibia than in the femur.

The non-operative treatment in spiral fracture of the tibia never adequately gets the ends in apposition and there is always at least an inch of shortening. The results of the band treatment it seems to me leave little to be desired as the bone is restored practically to its normal contour.

When plates are applied to the subcutaneous surface of the tibia, they usually have to be removed, as they are placed so superficially

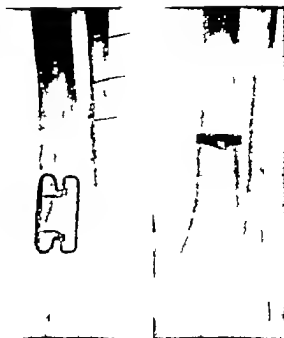


Fig. 4. A (left). Spiral fracture of the tibia in an adult. B same case after application of band.

beneath the skin that they ulcerate through by pressure. However band on the tibia hardly ever have to be removed practically never if the operation is aseptic.

The bands are applied as follows: a longitudinal incision through the skin, fascia lata and muscle exposes the fracture which is cleared of periosteum, reduced by extension and manipulation with the heavy Lane forceps in the usual way. Then the periosteum is cleaned from the bone around the central point of the line of fracture the Duff instrument passed around the bone and the band caught by the hook in the end and drawn around. The end is then threaded through the slot the hole caught in the pin and the screw turned until the band tightly encircles the bone. The band is then bent sharply back by depressing the handle of the instrument and the instrument freed and removed. The band is then cut off close to the slot with wire cutters and the end hammered down. The fascia lata is closed with a continuous catgut suture and the skin with silk worm gut without drainage. Smoothly applied sterile gauze and wadding and bandage plaster-of-



Fig 5 A Oblique comminuted fracture of upper end of femur

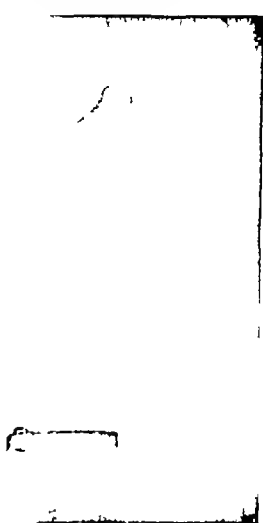


Fig 5 B Same fracture application of band

Paris sprica to thigh. The bandage should extend from the toes to above the knee in case of fractured tibia.

Six weeks in plaster is the time required for an adult thigh and four weeks for a tibia. Stitches are removed in ten days through a window cut in the plaster. On removal of the plaster of Paris union is usually complete. In femur cases the patient is kept in bed one week with the plaster off and then gets up on crutches. There is usually some temporary oedema on removal of the plaster of Paris.

Sepsis ought never to occur and may of course be insured against by adequate technique. If it does occur the wound must be opened, washed out and drained, but it may not be necessary to remove the band for four to six weeks, by which time bony union is complete. Infection may result in bad ad-

hesion of the muscles to the bone and in stiffness of the knee. It is a very serious matter and a reproach to the surgeon or hospital where it occurs. With a competent and a well trained staff we can count on avoiding it, but unfortunately, we cannot always be certain where constant changes in assistants are made and an occasional incompetent slips by, as in many of our large hospitals.

Since January 1, 1914 I have used the bands in 14 cases and the Lane plates in 7, showing that in 66 per cent of our operative femurs the bands can be used. Since January, 1911 I have plated 30 femurs. I have used the bands 9 times in oblique fractures of the tibia and have not used the plates at all for the tibia since we had the bands. I had previously used the plates for 13 tibias. I

have never used the bands for the forearm bones, fractures of which 16 in number I have subjected to open operation since 1911 11 were plated 1 wired 1 sutured (ole cranon) 2 open reductions, and 1 bone graft

The figures which follow have been chosen to illustrate cases suitable for treatment by the bands cases in which it would be difficult to get good and quick results by so-called conservative treatment Note especially Fig 3 A and B and Fig 4 A and B in both

of which a good and quick result was attained

As a result of this experience and the observation of the cases of my colleagues, I believe that the Parham and Martin band is of very valuable assistance in the treatment of many difficult fractures, and I wish to express my debt to the distinguished inventors and to say that it is not the only one of their contributions to surgery which has been of great value

NAILS AND SCREWS IN JOINT SURFACES

By ARTHUR T. MANN, M.D., F.A.C.S., MARY POLIS
Associate Professor of Surgery, University of Minnesota Medical School

THIS series of experiments was undertaken after nailing a fractured and misplaced external condyle in the elbow of a boy of seven through the joint surface in order to determine the behavior of nails and screws so placed and the joint changes in response to their presence

This boy was referred to me six weeks after the fracture with the fragment still out of place, though the usual methods had been faithfully used to replace it I was unable to replace it by any of the ordinary methods and determined upon an open operation After opening the joint we found the fragment rotated nearly one hundred and eighty degrees about a slight attachment to the external lateral ligament of the elbow and standing straight out from the joint Little or no callus had formed and it was fairly easy to reduce it but it would not stay in place It could not be made to stay in place either with the elbow at cut angle flexion, at right angles, or with the arm straight The head of the radius forced it out of place We decided to nail it through the joint surface This was easily done Firm adhesions developed to the tissues about the joint which later had to be broken up forcibly under ether This loosened the fragment somewhat from its bed but the final result was good serviceable arm with moderate limitation at the extremes of motion

The method described was suggested to me by an admirable article on joint fractures by Sherman and Tait in the course of which they detailed some experiments with Lane's plates, bone pegs, screws and staples and in

the course of which they stated that after a painstaking search they could find no case in the literature in which nails and screws had been used through the joint surfaces

I think my series of experiments bring out some further points of interest

In the whole series no joint became infected and no specimen was lost In most of them rubber gloves were used a few were done with the bare hands to see if the technique would stand this amount of exposure No dressings were used after painting the suture line with tincture of iodine and the dogs were allowed to run about without fixation of the joints Most of them favored the leg operated on for a time but as a rule they soon lost their limp and all of them were running about actively without a limp at the time the specimens were recovered

Dog No 600 Right knee Two nails were driven into the inner condylar and countersunk less than the thickness of the cartilage Moderate trauma was added to the cartilage about them Four months 6 days after operation (Fig 1) The nails are entirely covered with a thin layer of tissue apparently of the same color as the rest of the cartilage The cartilage is nearly smooth but not quite in the very close about the nails The semilunars and the joint cartilages are otherwise apparently smooth and normal, opposite the nails as elsewhere There is no staining of the heads of the crucial ligaments

Dog No 600 Left knee A five-eighths inch silver plated screw was countersunk into the inner



Fig. 1. Periment 690 right knee 4 months 6 days after operation. Two nail heads sunk less than the thickness of the ligament. The entire area covered with connective tissue.

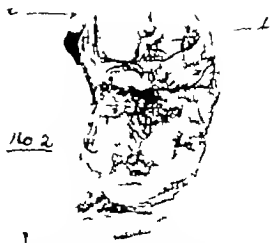


Fig. 2. Periment 690 left knee 3 months 12 days after operation. Five eighth inch silver plated screw sunk well below cartilage surface. Screw entirely covered. Condyle appears slightly built up over screw.

condyle of the femur well below the thickness of the cartilage. Three months less 2 days after operation (Fig. 2). A slight amount of blood was in the joint. The screw is entirely covered and the condyle apparently *slightly built up about the screw area*. The covering is not yet quite smooth and does not show quite as clear a translucent gray as the rest of the cartilage.

The cartilage on the outer posterior quarter of the other condyle shows some thinning, is a pale pink and the surface is not quite so smooth as the normal cartilage, possibly from overuse due to a faulty position of holding the leg during the stages of convalescence. This was the only case in which changes suggestive of osteo-arthritis were present. The cartilage of the tibial head suggests a very slight similar change while the semilunar seems normal. This was an old poorly nourished dog and we came to the conclusion that this was probably present at the time of the experiment and not the result of the experiment.

The surfaces opposite the screw seem normal. Though some blood was left in this joint the roots of the crucial ligaments are not as stained as in most of the other specimens, practically none at the femoral ends.

Dog No. 69. *Right knee*. Two nails were driven into the internal condyle of the right femur and countersunk well below the depth of the cartilage. Three months 24 days after operation (Figs. 3 and 4). The nails are completely covered and the tissue is almost level with the joint cartilage, slightly pitted but nearly smooth. The semilunar cartilage and the bearing surface of the tibia opposite the nails is perfectly smooth and normal. The cut surface shows no apparent overbuilding of

bone or cartilage above the normal level. Both nail heads are covered across with bone which is lined with tissue about the same thickness as the joint cartilage.

Dog No. 697. *Left knee*. One half inch silver plated screw was countersunk, not quite the thickness of the cartilage, into the condyle of the left femur. A second larger drill was used to take care of the flare of the screw head. Two months 20 days after operation (Figs. 5 and 6). There has evidently been a *slight upbuilding of the condyle* about the screw. The screw head is entirely covered by a thin plate of tissue at a lower level than the joint surface and with the lower edge growing over the edge of the screw with almost the joint level. The opposing joint surface on tibial and semilunar cartilages is smooth and normal. The cut surface shows bone beginning to grow inward over the top of the screw and is covered in turn by a thin cartilaginous or connective tissue.

Dog No. 726. *Left knee*. A silver plated screw was countersunk into the inner condyle of the left femur so that one edge was flush with the surface and the other edge buried one and one half millimeters below the surface. Six months less 2 days after operation (Figs. 7 and 8). The surface of the condyle has built up so that the free edge is buried. The edges of the tissue have grown over the screw head burying all but one-fourth of its area and has grown way across in the groove of the screw. The joint surface is glossy and smooth at all other places in the joint. There is no roughness or inflammation of the head of the tibia or semilunar cartilage opposite. The joint is apparently normal in every other way except possibly the slight atrophy of the head of the inner crucial ligament. The cut surface

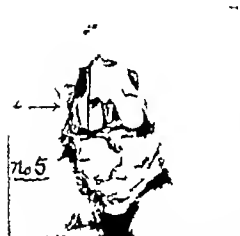


Fig. 3 Experiment 607 right knee, 3 months 24 days after operation. T nails below depth of cartilage. Nails completely covered.

Fig. 4 Experiment 607 right knee. Cut section, 3 months 24 days after operation. N apparent building up of condyle. Nails covered with bone and connective tissue.

Fig. 5 Experiment 607 left knee, 3 months 20 days after operation. One-half inch silver-plated screw sunk not quite the thickness of the cartilage. Screw entirely covered by this plate of connective tissue.

Fig. 6 Experiment 607 left knee. Cut section, 3 months 20 days after operation. Evidently slight up-building of the condyle about area of screw.

shows bone as well as connective tissue in the tissue growing over the edge of the screw head and the advancing tissue is not quite as thick as the normal cartilage of the joint.

Dog No. 76 *Right knee*. A steel screw was inserted as before so that its upper edge projected over 5 millimeter the lower edge being buried about 1 millimeter the inner edge flush with the cartilage and the outer edge about 0.75 millimeter below the free surface. Five months after operation (Fig. 9) *The surface of the condyle* is 1/2 p enough to more than make up for the projection of the screw. The edge of the screw is covered with

very slight extent three fourths of its circumference. Although the unexposed part is still free and uncovered. The joint is otherwise smooth and apparently normal, with no stretching of the tibial cartilage on the semilunar over which it swung and got its bearing except that a little gloss is lost on the surface. There is slight staining at the roots of the crucial ligaments at the femoral end. (The condyle was not sawed open.)

Dog No. 576 *Right knee*. Two nails were driven into the same condyle of right femur on anterior and other. The anterior one, a small head nail was driven in flush with the cartilage surface. The



Fig. 7. Experiment 576 left knee 6 months less. da. it. ope. t. Bil. pl. ted screw with n. edge flush with artilage. Screw buried all but e fourth f. t. rea. S. r. f. of condyl. is b. it. up so that th. free edge t. the screw is buried.

Fig. 8. Experiment 576 left knee. Cut surface 6 months less. da. after ope. t. n. C. nd. le. built. p. bout area. f. screw. and screw three fourths covered. th. bo. nd. connect. e. t. h. o. x.

Fig. 9. Experiment 576 right knee 5 months after operation. Steel screw with one edge projecting. ver. millimet. r. Edge of wr. w. slightl. ered three f. rths. x. t. r. microm. e. The. x. d. le. has built. p.

second was broken off below the head and the jagged edge was left projecting about 2 millim. t. r. bo. th. joint sur. Th. joint was freely swung back and forth t. ut a groove into the head of the tibia until it th. x. alon. artilage.

enough t. more than make up f. r. the projection f. the screw.

Fig. 10. Experiment 576 right knee 6 week. day f. ter operation. In. nails n. flush with artilage one projecting. bout. millimeters. Und. uted growth in thickness of the condyle. bout the nail. Nails partly covered with connect. e. tissue. b. Groove cut b. nail head of tibia partly healed and o. red smoothly with artilage.

Fig. Experiment 576 right knee. Cut sect. in 6 weeks day aft. parati. Und. uted growth in thickness of the bone. dyle th. th. rtilage no thicker than normal. Nails partly covered and no longer projecting.

Six weeks plus 1 day (Figs. 10 and 11). Und. uted growth. thickness over the major portion of the condyle about the region of the nail. to an. le. ation represented by the projection of the broken nail. Neither nail surface s. ntirely covered. Th.

new tissue is nearly smooth and apparently of the same character as the normal cartilage but in reality shows a connective-tissue structure. The groove which had been cut deeply through the semilunar cartilage, the cartilage of the tibia head, and into the bone has smoothed up and partially refilled in the six weeks. The surface is covered smoothly with cartilage looking like the normal cartilage of the joint surface. The joint cartilages are otherwise smooth and normal. There is no staining of the heads of the crucial ligaments. *The cut surface* The new increase in tissue seems directly due to new bone. The new cartilage which covers this elevated area is no thicker than the thin cartilage of the joint surface.

CONCLUSIONS

1 Nails and screws are tolerated in joint surfaces in the human as well as in the experimental cases and with surprisingly little reaction.

2 They have remained firmly imbedded in every specimen recovered.

3 In every case where the nails and screws projected above the joint surface, there was a distinct upbuilding of the condyle as Nature's reply to a rigid metal body projecting into the joint.

4 It is exceedingly interesting to find that the increase in joint level seems always due to the growth of bone and not to the increase in the thickness of the cartilage.

5 In each case where tissue grew across over the head of a nail or screw or across in the groove of the screw the new tissue showed a reversion to the connective tissue type.

6 Even when the nails and screws have remained more or less uncovered the dogs have run about normally after a short convalescence.

7 In each case the scratch or groove on the opposing surfaces was filled in as the projection of the nail or screw lessened by the upbuilding of the condyle. The defect was apparently entirely filled in all but one specimen and this was closing in nicely at the end of six weeks.

8 As a point in technique it seems better to swing a hinge joint freely at time of operation to scratch the groove made necessary by a badly placed nail or screw and thus save the time and pain which would be required in scratching the groove little by little later.

NEW MECHANICALLY AND SURGICALLY CORRECT METHOD OF BONE GRAFTING

COMPARISON OF VARIOUS METHODS OF OPEN TREATMENT OF FRACTURES

By PAUL B. MAGNUSON, M.D., CHICAGO

LANE PLATE

SINCE Mr Lane stimulated world wide interest in the open treatment of fractures with the introduction and use of the steel plate screwed onto the outside of the shaft of long bones, there have appeared many and devious ways of holding fractured fragments of long bones in apposition by many forms of mechanical appliances.

From a surgical standpoint, the Lane plate is deficient in the following ways:

1 In most individuals steel acts as an irritant both to soft tissues and to bone with which it comes in contact, favoring infection by producing a collection of serum around

the plate and lowering the resistance of the tissues immediately in contact with it, if not actually killing them.

2 The necessary length of the plate in order to secure proper leverage necessitates the loosening of the muscles from their attachment to the bone for a considerable distance on either side of the fracture, thereby producing unnecessary trauma and favoring infection.

3 The screws used in Lane plate operations are of the wood screw type and it is necessary to use at least four in each plate to prevent the fragments from angulating. The pressure of these screws on the bone gradually

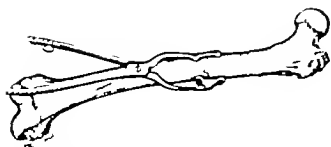


Fig. 1. Magnuson lateral bone lamp in position holding fragment in position. Outline of ant. d. d. graft shows g. w. dth of med. lary. t. t. s. t. f. f. t. u. r. e. one eighth inch wider at p. p. o. s. i. t. i. o. n.

produces necrosis of the bone cells immediately surrounding them allowing the plate and screws to loosen in a comparatively short time. This allows the plate to move and further irritate the tissues both bony and soft which further produces a favorable field for infection.

These are in brief the main objections to the use of the Lane plate from a surgical standpoint.

From a mechanical standpoint the only bearing surface which the Lane plate affords in holding the bone in line is that which is provided by the small wood screws driven through the plate and into the bone. This is a very weak form of mechanical union and when taken in conjunction with the fact that pressure of the screws produces necrosis of the bone immediately in contact with them we have double reason for not wishing to trust entirely to the support of a contrivance of this kind.

In spite of these objections there are some cases in which it is impossible to use anything but the Lane plate in repairing a fracture and one should always be at hand to suit the occasion no matter what plan is made before the operation.

THE BONE PLATE¹

The bone plate of Brougham and Ecker has the advantage of being non irritating and easy of application but has the disadvantage of the Lane plate in that the muscles must be disturbed from their connection with the bone over a relatively large area. It is

¹Brougham and Ecker. A preliminary report on the treatment of fractures by the use of bone plates and bone screws. Surg. Gynec. & Obst.

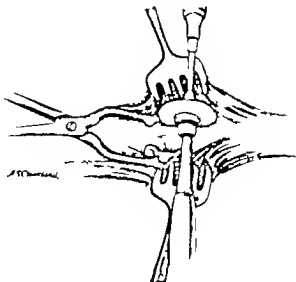


Fig. 2. A thor's circular saw cutting side of bone graft. F. d. of graft is cut with thin bladed hovel or smaller saw with single handle. Note distance between j. w. of clamp and wing free room to work.

claimed that this plate is absorbable. In the author's experimental work however with both dead bone and ivory it has been shown that neither dead bone nor ivory are absorbed except where they are closely surrounded by bone. The screws driven through these bone plates and into the bone cortex will eventually be absorbed only in such part as lies within the bone leaving the plates without any attachment except an incapsulating fibrous tissue which forms around them. The mechanical application of the plate to the outside of the bone throws an undue strain on a substance which is brittle and which is not braced on all sides and consequently subject to easy breakage.

Brougham and Ecker have used the screw principle introduced by the author of tapping a thread in the bone and bone plate and using bone screws which undoubtedly hold much better than steel screws. The plate however is weak at the points where the screws are driven through it. The objections then to this form of apparatus are from a surgical standpoint the loosening of the muscles and production of extra traumatism in the application from a mechanical standpoint its weakness at the points where the screws penetrate the plate.

These plates however are improvements over the Lane plate and should constitute a

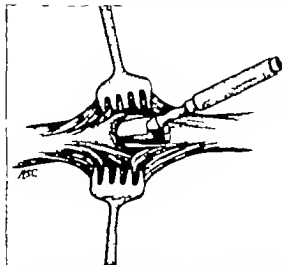


Fig. 3. Clamp removed and fragments slightly angulated to allow insertion of graft into medullary cavity of opposite fragment. The socket wrench, such is used in driving the screw is also used as an instrument to drive the graft in. Dotted line shows the final position of the graft inside medullary cavity.

part of the equipment of the surgeon doing any amount of open treatment of fractures.

IVORY SCREWS

In 1908 the author introduced the method of retaining fragments of bone in correct apposition by the use of ivory or bone screws. The channel for these screws was first cut out by drilling a hole smaller than the screw to be used and tapping a thread within the bone with an ordinary mechanic's tap. This method has proved highly satisfactory in the treatment of oblique fractures of all kinds since it does away with the necessity of dissecting loose to any extent, the muscles attached to the fractured bone. The field of operation can be made small and traumatism to the bone and soft tissues reduced to a minimum. The screw holds the rough ends of the fragment in close apposition not only in one plane but in all planes. It fits snugly into the hole made for it, but not so snugly that it produces necrosis of the cells surrounding the screw. The retention apparatus is small as compared with the size of the bone

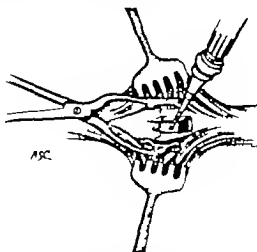


Fig. 4. Fragments brought back into line. Graft in place. Drilling hole through graft and opposite side of cortex preparatory to cutting thread for ivory screw.

but on account of its mechanical construction which follows the lines of a machine screw rather than a wood screw it has a long bearing surface. This screw is cut off flush with the cortex on both sides allowing nothing to project into the soft tissues to irritate them. Neither the ivory nor bone screw will irritate the tissues with which it comes in contact. This operation is simple and is easily and quickly performed. If the oblique surfaces of the fracture are long a screw at each end of the obliquity will hold against any pull of any group of muscles in the body not allowing angulation or displacement of the fragments and allowing early motion of the joints above and below the fracture.

One ivory screw has been used in the treatment of a slightly oblique fracture of the femur on a number of occasions, with perfect results. An article to follow reporting a series of cases of open treatment of fractures with the use of ivory plates and screws will contain the X-ray pictures and photographs of these cases.

From both a mechanical and a surgical standpoint the screw used in this way is an ideal method of treating oblique fractures.

IVORY PLATES

In transverse fractures it is impossible to use screws alone. It was therefore necessary

Memorandum Lengthening shortened bones of leg. Univ. Penn. M. Sch. 1908, May. Ivory plates and screws in the open treatment of fractures. J. Am. M. Ass. 1911, Dec. Lengthening short and bones of the leg by operation. Surg. Gynec. & Obst. 19, 1, 1910, 64.

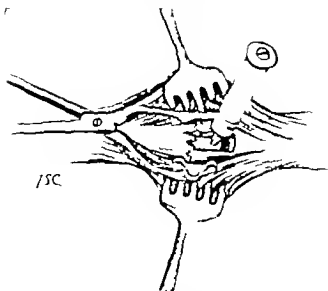


Fig. 5. Method of approach used by the author in 1908 used for cutting threads in bone the same size as screw to be used.

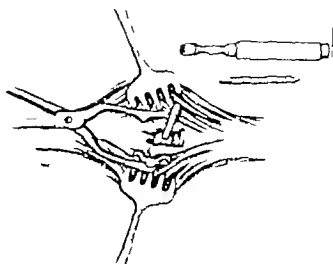


Fig. 6. Socket when held as screw driver. Squares head of every screw. Screw being inserted into graft as bolt it is a part of what it was taken from.

to devise some method which would meet the following requirements:

1. Minimum traumatism in application.
2. The substance must be non irritating to the bone and soft tissue.
3. It must remain *in situ* without loosening.
4. It must be strong enough to hold against strains in any direction and the constant pull of any group of muscles without allowing angulation or shortening.

In order to meet the first requirement the apparatus must necessarily be small. It had been proved that ivory was non irritating to bone and soft tissues. It had also been proved that ivory did not loosen, which was also true of dead bone. The fourth requirement — strength — gave ivory the preference over dead bone and it was therefore used instead of the latter.

The method used consisted in the cutting of a slot or as mechanics term it a keyway into the bone by parallel circular saws the slot being exactly the width and length of the plate to be used and extending across the fracture in the long axis of the bone the length of the largest plate being one and three fourths inches long and three sixteenths inch thick by one inch wide. A keyway and key is the strongest form of mechanical union known so far as a shaft is concerned the key

being braced on all sides but one by the material into which it is driven. As long as this key remains in the keyway and is fixed by pegs driven through the key and shaft at an angle to the key holding it down into the slot it is impossible for any motion to take place between the fragments of the shaft. This operation eliminates the necessity of loosening the muscles from the shaft for more than an inch on each side of the fracture reducing the amount of traumatism to a minimum. The retention apparatus is very small and is as previously stated non irritating. The plate is driven snugly into the slot cut through the proximal side of the cortex only its lower edge being driven tightly against the medullary side of the opposite cortex. As in the case of the screws the application is snug but not tight enough to produce necrosis of the bone-cells immediately in contact with it. The ivory being braced on all sides by the bone cortex has sufficient strength to resist all strain which is exerted on the fragments by the muscles and in the very nature of its application will not allow the slightest angulation.

This operation has proved very satisfactory not only in the hands of the author but at this writing in the hands of many surgeons. Special instruments are needed to perform it but this is true of every operation as it is in other mechanical lines of work.



Fig 7 Cross section of graft through plane of screw showing slot out of which graft was taken. Position occupied by graft in medullary cavity and screw through graft and cortex of opposite side holding graft firmly in place.

THE INTRAMEDULLARY BONE GRAFT

The intramedullary autogenous bone graft as used and advocated by Murphy was one of the first forms of autogenous graft used in the open treatment of fractures. This necessitates cutting down on the tibia and removing the crest, reaming out the medullary cavity of the fragments above and below the fracture. This destroys at least part of the endosteum, delays union to some extent, and produces considerable hemorrhage. The graft is then inserted into the medullary cavity of one fragment to almost its full length, the fragments being slightly angulated out of the wound and the graft being worked into the medullary cavity of the fragment not already occupied by it. This, of necessity makes a weak and loose mechanical union. It will hold the fractured pieces from moving past each other but will not prevent angulation to a certain extent. The bone graft strikes the inside of the cortex at three points namely at each end and at the fracture. This gives a lever of the first class permitting any jolt or jar to break the graft, or the pull of the muscles to gradually bend it, unless the external dressing is firmly fixed which is almost impossible in cases of fracture of the femur just below the trochanters.

This operation necessitates opening up not only the bone which has been fractured, but making a wound in the lower leg necessitating two operations instead of one.

THE BONE INLAY

The bone inlay as advocated by Albee follows the same principles as the ivory plate the advantage of it over the ivory plate being



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Fig 8 Longitudinal section through bone graft and screw showing position of graft in medullary cavity. Slot left by extension of graft and screw holding graft in place.

that it possesses bone regenerating power. The objections to it are that it necessitates cutting down on the tibia to secure the graft, producing extra traumatism of this bone and necessitates extensive cutting operations on each side of the seat of the fracture loosening up considerable distances of muscle from the bone and cutting a considerable trough of bone out on both sides of the fracture.

As first described by Albee this bone graft was tied in with kangaroo tendon run through small drill holes at the edge of the slot, and through the edge of the graft. Sutures have never been a strong form of mechanical union in bone either in the shape of wire or kangaroo tendon or the like and it should be borne in mind that a severe strain by muscle pull is put on every fracture retention apparatus, whether it be external or internal. Albee has recognized this fact in his recent work by introducing the use of an autogenous bone screw put in in the way described by the author and already referred to. The use of the autogenous screw is unnecessary takes a considerable amount of special equipment, lengthens the time of operation, and has no advantage over the ivory or dead bone screw since it is the bone graft which is depended upon to regenerate bone at the seat of fracture. This procedure then is superfluous. It is impossible without producing tremendous traumatism and hemorrhage to cut out a key of bone and fit it into a full length slot as described by Albee in the case of a femur or humerus and these are the bones most frequently necessary to treat by open operation.

It is also practically impossible without producing tremendous traumatism to cut a long slot on one side of the fracture and a short one on the other moving the long piece of bone down across the fracture and using

the short piece for the purpose of making bone screws as described by Albee without freeing the muscles from the bone for a considerable distance on each side of the fracture producing a great deal of hæmorrhage both from the muscle and bone and lengthening the time of operation and shock thereof to an unwonted extent. This operation can be done very nicely on the tibia where the bone lies immediately under the skin and where there is no muscle to contend with. Consequently favorable reports of this sort of graft in the tibia mean comparatively little.

It was to correct the defects mechanically and surgically in the bone grafting operation that the procedure next to be described was devised. The requirements were (1) To secure an autogenous graft as small as possible to assure firm retention of the fragments. (2) to eliminate the necessity of traumatizing other fields than that of the fractured bone. (3) to shorten the time of operation and (4) to place the graft in the bone in such a way that it would prohibit motion in any direction and hold against any pull exerted on it by the muscles attached to the shaft.

This was done by cutting a short graft from the fractured end of the most convenient fragment either proximal or distal. This graft was cut in the shape of an extremely long sided truncated cone. The end of the graft which formed part of the fractured surface is exactly the width of the medullary cavity and the end farthest from the fracture not over an eighth of an inch wider than the medullary cavity the graft being from one and one half to two inches long and covered by periosteum. The sides of the graft being cut out with the circular motor-driven saw the end of the graft is freed with a thin bladed chisel. The opposite fragment is then angulated slightly out of the wound and the graft driven in to the end of the medullary cavity to half its length. On account of its wedge shape it fits snugly. The fragment

is then brought back into line with its fellow and the protruding end of the graft is driven down into the slot out of which it came. This being the wider end allows for the thickness of the saw blade on each side and yet allows the graft to come closely in contact with the walls of the cortex on each side and sink down into the medullary cavity. The result now is that one end of the graft is firmly driven into the end of the medullary cavity of one fragment the other end being driven into the lower end of the slot out of which it came. There is no way of angulating these fragments except by one end of the graft slipping out of the slot or keyway. This was provided against by drilling through the graft and the opposite cortex tapping a thread in the bone and putting through an ivory screw which holds the key firmly down in the keyway. The screw is then cut off flush with the graft leaving nothing protruding beyond the cortex on one side or the graft on the other and leaving a one inch trough above the graft to be filled in with new bone.

This operation has been extremely satisfactory in the hands of the author and a few other surgeons who have seen fit to use it. It does away with the necessity of cutting into any other bone to procure the graft and meets all the mechanical requirements of a strong union. There is not as much loosening of the muscles as there would be in a Lane plate operation but somewhat more than in the ivory plate operation. In cases of ununited fracture the bone graft is preferable to any dead bone substance.

The technique described shortens the time of operation lessens the shock and does away with a large amount of the hæmorrhage which occurs when the graft is taken from the tibia. Therefore we believe it meets all the mechanical and surgical requirements of the internal splint and that it will be found to be much more satisfactory than the methods heretofore advocated.

A CONTRIBUTION TO THE ETIOLOGICAL STUDY OF OVARITIS¹

B. CARL HENRY DAVIS, M.D. CHICAGO

From the Memorial Institute for Infectious Diseases and the Department of Obstetrics and Gynecology, Rush Medical College

ELABORATE studies have been recorded giving the histological changes which occur in acute and chronic ovaritis. The bacteriology of acute ovaritis has been studied extensively but heretofore little has been accomplished in the cultural studies of the chronic inflammations associated with sclerosis and cystic degeneration. The newer bacteriological methods as emphasized especially by Dr. Rosenow have made this study possible. That some of the acute infections of the ovary may be of hematogenous origin and not a direct extension from the lower genital tract was suggested by Lawson Tait many years ago and is supported by many recent clinical observations. Rosenow has demonstrated that bacteria from foci of infection and the involved tissues in various diseases from which the streptococcus is recovered, such as appendicitis, ulcer of the stomach, cholecystitis, erythema nodosum and herpes zoster tend to infect electively the corresponding organs in animals, when injected intravenously and recently he has shown that some of the streptococci which we recovered in chronic inflammation of the ovary showed elective affinity for these structures in animals.

Using a technique which has been described in other papers, Dr. Rosenow and I have cultured 65 ovaries. In three of the patients the condition was rather acute and in these the streptococcus viridans was recovered twice and the gonococcus once. The other patients had chronic pelvic disorders. In ten cases the cultures remained sterile after a week's incubation. In the remaining 52 cases in which the ovaries showed fibrous and cystic degeneration, streptococci were isolated 30 times, the number of colonies ranging from one or relatively few usually in the depths of the ascites-dextrose agar to countless numbers. They were present in pure culture in 8 and associated in the others with the Welch bacillus, a few staphylococci or colon bacilli. Welch bacilli were found in small numbers in

21 diphtheroid bacilli in 10, a few colonies of staphylococcus albus in 9, the gonococcus in 2, the colon bacillus in 3 and an anaerobic streptothrix in 1.

The associated abdominal conditions were carefully recorded in 56 of the histories. Fibromyoma of the uterus was found in 18 patients, and the ovaries from 15 patients gave positive cultures—the streptococcus viridans being isolated from 11 and the Welch bacillus from 8. Salpingitis was reported eleven times, and the ovarian cultures were positive from 9 streptococcus viridans in 8, Welch bacillus in 3 and gonococcus in 2. Chronic appendicitis occurred 11 times and the streptococcus was recovered from 8 of the ovaries. Eight patients had a chronic cholecystitis and 6 of the ovaries cultured contained the streptococcus viridans.

Only a few of the women with chronic ovaritis gave a history of a preceding acute pelvic infection. In a number it seemed evident that the pelvic symptoms were the result of contracting a cold during the menstrual period or followed definite attacks of tonsillitis. In others the pelvic symptoms were subsequent to some one of the acute infectious diseases of childhood. While many of the women were married and more exposed to the conditions producing ascending infections, a number were undoubtedly virgins and in at least one patient, in which the ovarian cultures showed the streptococcus, the possibility of an ascending infection can be definitely eliminated.

MICROSCOPIC ANATOMY OF THE HUMAN TISSUES

The microscopic changes were such as have been described in the extensive studies on fibrocystic degeneration of the ovary and do not call for detailed description. With the help of W. L. Brown, 16 additional ovaries have been studied since the joint report with Dr. Rosenow making a total of 39 ovaries which have been carefully examined. In a

number these were remnants of follicles which were largely replaced by connective tissue and surrounded by round-cell infiltration. The stroma in all showed marked fibrosis and frequently small islets of the interstitial cells. The blood vessel walls were thickened. The walls of the small cysts were infiltrated with numerous round cells while the walls of the larger ones were made up of old connective tissue. Nests of round-cell infiltration were found in many chiefly surrounding the blood vessels and in the walls of the graafian follicles. In a number aggregations of leucocytes were found within and around small blood vessels especially in those in which the portion cultured showed a relatively large number of streptococci.

To demonstrate the bacteria in the tissues was extremely difficult but in sections from eleven ovaries including the eight previously reported where the cultures showed a large number of the streptococci Gram Weigert and methylene blue stains showed diplococci. They were found usually in the areas of infiltration and in at least one case in the wall of a corpus luteum.

Discussion Lawson Tait in his monograph on *Diseases of the Ovaries* says "So far as I know acute ovaritis is the result of four diseases only

- 1 Injury
- 2 Gonorrhœal infection
- 3 Septic poisoning in the parturient condition

4 Exanthematic fevers and acute rheumatism

Thus it is evident that Tait recognized non-ascending acute infections of the ovary dependent upon the exanthematic fevers and acute rheumatism even though he had no knowledge of the bacteriology of these conditions. He says "In 1870 and 1871 and still more in 1874 my attention was drawn to the occurrence of acute pelvic peritonitis in women after attacks of scarlet fever and small pox these attacks leaving indications which showed clearly that the mischief began in the ovaries. Accident enabled me to trace the subsequent history of two such cases and I found that in both the menstruation became greatly diminished in amount

and that it was accompanied by severe dysmenorrhœal symptoms and that in one of the cases it entirely disappeared. From these cases I began to suspect that the attacks were primarily due to inflammations of the uterine appendages and that this had some kind of relation to the zymotic disease which preceded it. Later he writes "I have only once had an opportunity of dissecting a case where I had recognized chronic ovaritis in life and then it certainly was the result of acute rheumatism. It occurred in the case of a girl seventeen years old who had suffered from eight or nine attacks of rheumatic fever. In two of them she was under my care as a dispensary patient and after the recession of the particular infection an attack of pelvic pain came on which was increased by pressure and the attack was accompanied by an irregular menstrual flow. The whole passed off in a few days after the application of a blister but ever afterward her menstruation was irregular profuse and painful and she suffered from the symptoms which I shall describe immediately. I regarded the attack as one of mild acute or subacute ovaritis followed by a chronic stage. She died subsequently of embolism of a cerebral artery and I found her ovaries large soft covered with lymph and dotted with enlarged follicles and the peritoneum was thickened around them. The left ovary was adherent to the rectum and it had nearly the whole of the fimbriae of the corresponding tube glued to it.

It has long been recognized that mumps are apt to cause orchitis in men and ovaritis in women. But Joel in 1886 called attention to the occurrence of orchitis in boys and ovaritis in girls following tonsillitis. For generations women have recognized that to take cold during a menstrual period was apt to result in a suppression of the menses with subsequent dysmenorrhœa and often pelvic pain. Our textbooks all recognize this fact but I have never seen a satisfactory explanation.

The recent writers of books on gynecology all recognize the possibility of non-ascending infections of the ovary but they apparently believe that most of the infections are ascending. Dr Webster writes (p. 365) on the

etiology of acute ovaritis. Various infective conditions e.g. especially infection following abortion or labors gonorrhoea, pneumonia, mumps, the acute exanthemata, tuberculosis actinomycosis etc. And (p 366) Chronic inflammations of the ovary may be the sequel of an acute attack such as has been described or it may develop slowly with no definite onset.

Active congestion displacements and twistings are favoring conditions. It is frequently secondary to infectious processes in the uterus and tubes. It is very frequently associated with fibromyomata of the uterus and large ovarian tumors of the opposite side. Of all the causes gonorrhoea is one of the commonest. It may be secondary to appendicitis. Findley says. Chronic ovaritis may be the terminal stage of an acute infection of the ovary. Any condition causing prolonged congestion of the ovary will result in chronic ovaritis such for example as sexual excesses, menstrual congestion, subinvolution malpositions of the uterus, habitual constipation incompetency of the cardiovascular system, pelvic and abdominal tumors, and the disorders of the organs of digestion. Findley made a careful study of 180 cases operated on for cystic ovaries by Dr Webster and himself. He found that. The usual infectious diseases of childhood were experienced in 65 per cent of the 180 cases and there was a history of puerperal post abortive, or gonorrhoeal infection in 63 per cent. He believes from this study and a review of the literature that. Cystic degeneration of the ovaries is almost invariably the result of chronic ovaritis. This is the consensus of opinion of Virchow Gebhard, Abel Kolb Ruge Pfannenstiel Amann, Martin and Frankel (Findley).

Wilder in a recent paper presents strong evidence that acute streptococcic ovaritis may follow the streptococcic sore throats. He quotes three typical cases reported by Leyden, Kunzel, and Schwern, and adds a fourth personal observation. In these four cases there can be little doubt but that the acute infection of the ovary was blood borne and in each case secondary to the infection in the throat. Yet with the normal genital

tract it is almost impossible to prove from the study of the cases that the infection could not have been ascending. But this clinical evidence is proved by the case in our series in which chronic salpingo-ovaritis had developed in an eighteen year-old girl in whom there was no passage between the vagina and uterus. It is further strengthened by a case in which there was a congenital stenosis of the uterus with a double cavity. The cultivation of streptococcus viridans from the ovarian tissue in these cases, the demonstration of the organisms in sections of these ovaries, the experimental production of ovaritis in animals, and the finding of the organisms in their ovaries explain clearly how a patient may contract chronic ovaritis without a preceding infection of the lower genital tract. While allowance must be made for the possibility of direct extension of infection from some other infected organ such as the appendix, the finding of the colon bacillus in only 3 cases is good evidence that chronic ovaritis can be but extremely rarely if ever due to organisms which have passed through the normal bowel wall.

While the experimental work explains the importance of the streptococcus in ovarian degeneration, the significance of the Welch bacillus in one-third of our cases is not so clear. Since this organism is found so frequently in the cultures of tissues of carnivorous animals it has been thought that it is as the rule, a rather harmless invader. But Williams states that the bacillus aerogenes capsulatus is occasionally concerned in puerperal infection and several cases have been reported from his service at the Johns Hopkins Hospital. In our series a pure culture of the Welch bacillus was obtained from the ovary of a woman who had suffered with puerperal sepsis but while the ovarian trouble dates from the sepsis it may not follow that this organism was responsible for either the degeneration or the preceding sepsis.

From our cultural studies of 65 ovaries it would appear that the streptococcus viridans is the most common organism associated with the chronic degeneration of the ovaries, being found in approximately 50 per cent of the cases. The Welch bacillus was found

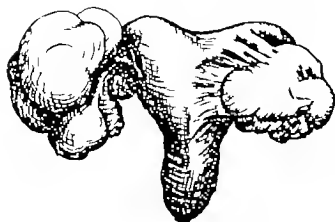


Fig. 1. Drawing of specimen Case 960.

in 33 per cent but is probably of little importance. Other organisms are apparently found rarely in the usual chronic degenerative changes of the ovary. While the gonococcus is undoubtedly a common cause of acute infections of the ovary it is not found in the more chronic conditions and our results suggest that some of the chronic pelvic conditions which were formerly credited to the gonococcus may have resulted from nonascending infections with the streptococcus viridans.

The fact that ovaritis is so much more common than is orchitis is of considerable significance. Wilder in his review collected 56 cases of primary peritonitis probably all of the streptococcal type of which 44 or nearly 80 per cent were in females. He believes that in most of these that the primary infection was in the ovary and the peritonitis secondary. It has been suggested that the corpus luteum is often the point of inoculation. Certainly the fact that women are so prone to infection of the ovary at the time of menstruation is a strong argument in favor of this suggestion. That the tube may become infected from the ovary or the ovary from the tube is generally accepted and it is also probable that both are infected simultaneously from the blood stream in some cases of bacteræmia.

The following two cases which were reported in the joint paper with Dr. Rosenow are of so much importance in the discussion of this subject that they must be included in our case histories.

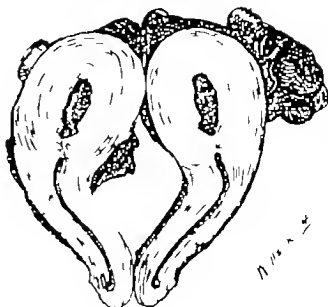


Fig. 2. Drawing of specimen Case 960.

CASE 960. A girl of 18 years entered the Presbyterian Hospital complaining of a dull heavy aching pain in the right inguinal region which recurred each month during the past year lasts three days and then disappears. She has never menstruated. At the operation Dr. Webster found an imperforate vagina one inch long the uterus was retroverted the cervix lay posterior to the vaginal wall and was only attached to the corpus by means of a fibrous band there was considerable thickening of both tubes with closure of the right fibrous and cystic degeneration of both ovaries especially the left and adhesions about the rectum and appendix. He did a modified panhysterectomy and appendectomy.

A drawing of this specimen is seen in Figs. 1 and 2. Twelve colonies of streptococcus viridans were grown from a portion of the left ovary and a diplococcus was demonstrated in the sections.

CASE 33. A single woman age 30 entered the Presbyterian Hospital on the service of Dr. Billings July 30, 1914, complaining of multiple enlarged swollen tender painful joints and muscles particularly the jaw elbows hands and feet with marked limitation of motion and fixation. The arthritis began three years before some weeks after a severe attack of tonsillitis. There had been recurring exacerbations and remissions of the symptoms but on the whole they had steadily progressed. She had lost 30 pounds in weight during the past year and a half and in the past year had developed a severe dysmenorrhea. Cramps and nausea had lasted throughout the period and often for eight or ten days following. Except for frequent attacks of tonsillitis and a chronic rhinitis the patient had been in fairly good health until three years before when she had the attack of tonsillitis with an abscess of the tonsil. The tonsils were removed

nine weeks after the arthritis began and she improved greatly. She had measles and whooping cough in childhood. During the past year she had been curetted twice for the dysmenorrhea without relief. The patient had good appetite and slept well. The bowels were regular there was no urinary disturbance no leucorrhea at the time of examination, no cough, no dyspnea, no night sweats, no edema of the feet no cardiac or gastric disturbance no jaundice no diarrhea, no chills or fever. The examination was negative except for the condition of the joints, the finding of small remnant of the left tonsil, and some bad teeth. X-ray of her hands showed that there was complete ankylosis of some of the fingers, with marked destruction of the cartilage in the balance of the joints. The remnant of the tonsil was removed and the condition of her teeth rectified. The patient left the hospital and returned again in January 1905. The symptoms of the arthritis had greatly improved but she complained of excessive menstrual flow for which she was curetted by Dr Webster but without relief.

On March 23, 1905, Dr Webster removed the left ovary ligated the uterine arteries, removed the appendix and a small fibroid from the back of the uterus. Cultures of the ovary were made by Dr B. O. Raulston and the streptococcus viridans obtained in large numbers. Dr Rosenow injected sub-cultures into three female dogs and four female rabbits in doses ranging from 4 to 95 cubic centimeters of the broth culture suspended in salt solution. All but one rabbit recovered. The animals were chloroformed on the second and third days after injection. All of the animals injected showed lesions of one or both ovaries. Five showed in addition distinct arthritis on myositis one cholecystitis and two hemorrhages and edema of the thymus. Three showed lesions in the uterus, and one hemorrhage in the fallopian tubes. Filtrates of this broth-culture, on the other hand, injected into two rabbits in equivalent and repeated doses failed entirely to produce lesions in the ovary or otherwise.

Following the operation in March, the patient a general symptoms were much better but the menorrhagia soon returned and on October 5, 1905, Dr J. C. Webster removed the uterus and remaining ovary. Cultures of this ovary were made by Drs. F. Garde and G. Coleman and the same organism was again isolated. This injected into rabbits produced arthritis, but unfortunately their ovaries were not examined for lesions.

When seen on March 5, 1906 the patient stated that she had gained twenty pounds in weight and that she feels much better in every way. She still has joint pains but less severe.

The following histories are chosen from the cases cultured because of the large numbers of organisms found in the cultures and the variety of associated conditions.

No. 90380, Mrs. D. age 24 entered the Presbyterian Hospital, November 1905 complaining of weakness, a constant feeling of tiredness, headaches, backache, pain in the lower right quadrant of the abdomen, leucorrhea and constipation.

During the past year she had felt tired and weak all of the time especially on arising in the morning. During the past four months she had been unable to work. She has had severe headaches during the past few months, frontal in character dull aching in type, present nearly all of the time. They are especially severe in the morning and are gradually growing worse. During the same period she has had a dragging backache. For over a year she has had some pain in the right lower quadrant of the abdomen. Four months ago it was very severe but of late it has been causing less trouble. She says that there is a feeling of soreness which comes

whenever she is tired and is always worse during the menstrual period. During the past four years she has had marked leucorrhea. Two years ago it was most severe but is better now. During the past three years she has had marked constipation. The patient says that she has had no sickness other than the diseases of childhood.

She was married 5 years ago but has been separated from her husband for years. She had one pregnancy 3 months after marriage and aborted.

The writer dictated the following findings at the operation. Numerous adhesions between the uterus and the rectum holding the uterus in retroversion. The left ovary is about the size of a small English walnut and is buried in a film of adhesions. The left tube is somewhat thickened. The right ovary and tube are buried in adhesions and fastened to the brim of the pelvis. The ovary is moderately enlarged and markedly cystic. The appendix is 4 inches long slightly thickened, but free from adhesions.

Operation. Freeing of pelvic adhesions. Right salpingo-oophorectomy. Webster round ligament operation. Covering of the raw surfaces in the pelvis. Appendectomy. Cultures of the right ovary showed many colonies of streptococci. Mrs. D. reports March 26, 1906 that she is free from pain, has no headaches or backaches, no constipation. She is at work in an office and while she still tires easily feels perfectly well.

No. 90236 Mrs. R. C. age 49 married ten pregnancies, no miscarriages or abortions.

The patient complains that during the past year she has had considerable pain in her back, intermittent in character present during the day but not at night. The aching is worse when she is on her feet, is relieved by massage and by lying down. It has steadily been growing worse. The menstrual flow has steadily increased in amount during the past 4 or 5 years but has not increased in duration. The abdomen has been increasing in size during the past 4 years until now it has the appearance of a 5 or 6 month pregnancy. There has been some loss in weight. During the last

3 years she has had a severe leucorrhœa. Her past history is negative. Her family history is negative. Habits are negative.

Dr Webster dictated the following findings at the operation. The uterus is enlarged by tumor mass 8 inches in diameter. Both ovaries are cystic. There is a hydrosalpinx condition of both tubes. There is a simple cyst of the left ovary 2 inches in diameter. Gall bladder is free and normal. Right kidney is scarcely movable. Left kidney is scarcely movable. Stomach is normal. No nodules or enlarged glands are found in the upper abdomen.

Operation. Supravaginal panhysterectomy. The tumor was found to be an interstitial throid of the uterus which had undergone a myxomatous degeneration. The sections showed no evidence of malignancy. Cultures of the ovaries showed many colonies of streptococci.

CASE 5248. Miss S., age 34, entered the Presbyterian Hospital June 1910 complaining of constant backache, constant tenderness in the lower abdomen, leucorrhœa, and general weakness having been in bed most of the time during the past three years. Bowels are regular. Menstruation is of the regular 29-day type preceded by soreness in the breast for ten days, slight dysmenorrhœa. Has cold chilly sensation most of the time. Has no urinary disturbances. No history of sickness other than the diseases of childhood.

Operation June 22, 1910. Dr Webster dictated the following findings. Uterus is retroposed 3 inches deep and dilates with difficulty. Prolapsed in flamed degenerated ovaries. Marked adhesions in the pelvis. The appendix is thickened.

Operation. Dilation and curettage, removal of the left tube and ovary, ligation of the right ovary, removal of the right tube, Webster round ligament operation, appendectomy. The patient had a normal temperature when she entered the hospital but following the operation her temperature went to 101.4 and remained 100 or over most of the time during the following week. Her pulse varied from 120 to 100. She was discharged in good condition July 12, 1910.

Miss S. entered the hospital again June 14, 1914, complaining of pain in the right lower quadrant of the abdomen, nervousness and general weakness. She stated that the pain is worse during the menstrual period. She has not been very much better since her operation four years ago.

Operation June 15, 1915. Dr Webster dictated the following findings. There are adhesions of the omentum along the anterior abdominal wall. The right ovary is enlarged cystic and fastened with a lhesion. The uterus is adherent to the rectum and bladder. The gall bladder is normal.

Operation. Hysterectomy and right oophorectomy. Her temperature went to 100.5 the second day after the operation and varied between 99 and 100 during the first ten days after the operation.

November 1915. Miss S. reports that she is free from pelvic and abdominal pain. Physically she

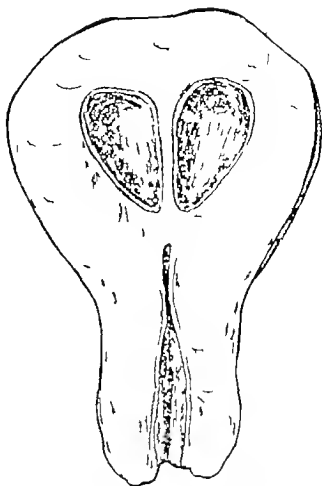


Fig. 3. Somewhat schematic diagram. Case 85742. Mrs. M., aged 9. Since her fifteenth year she has had subjective symptoms of menstruation every 8 days. Had a laparotomy when fifteen. Both tubes and one ovary removed. Had abdominal drainage for four days. During past year she has had little potting with pelvic cramps on two occasions but has never menstruated.

Operation by D. Webster revealed dense pelvic adhesions with loops of bowel attached to the uterus and remnant of the left ovary. Section of the uterus revealed the congenital malformation as shown in the above diagram. She was operated during an attack of so called menstrual pain and fresh blood was found in both cavities of the uterus. The endometrium was very thin and showed no evidence of inflammatory changes.

is perfectly well but states that she suffers from attacks of melancholia and that she often has severe headaches in the top of her head. She feels particularly bad in the morning but as the day passes she gradually loses her depressed feeling provided she is with cheerful company and usually feels good in the evening. She does not suffer from hot flashes and never has had them.

She states that as a girl she was subject to tonsillitis but that the tonsils have not bothered her for many years. The pelvic trouble started with a severe cold contracted during the menstrual period.

and gradually became worse. She was a chronic invalid for about twelve years.

Miss J. W. age 24, entered the Hospital May 9, 5 complaining of swellings on each side of the lower abdomen, pain in both lower quadrants of the abdomen, tenderness of the right breast. The patient states that she was perfectly well until about fourteen months ago when she noticed a marked increase in the pain during the menstrual periods about the same time there appeared swelling in the left side of the lower abdomen which was tender to the touch and to the pressure of her clothing. A little later a smaller lump appeared in a corresponding position on the right side. These swellings have persisted and are still tender to the touch.

The pain is bilateral but more marked on the right side. It is usually of a dull aching type but occasionally she has attacks of sharp sticking pain. These occur at intervals of four to six days. These attacks are very brief, lasting but a minute or two and they do not radiate. About six months ago her symptoms were so marked that she was confined to her bed for three weeks. Recently she has been much worse again. The right breast has been tender and painful for seven weeks but has not been red or swollen.

Her past history is negative except for measles and whooping cough as a small child and some kind of a fever at the age of nine. Menstruation began at 3 years, regular 28-day type of 3 days duration until one year ago when she began to flow for two days skipping a day with return for two days.

The pain is increased during the periods.

Dr. Webster dictated the following: Gall-bladder normal, kidneys each have a 28-inch range stomach normal, appendix 7 inches long and fastened with adhesions, uterus enlarged by a tumor mass (fibromyoma) 4 inches in diameter right tube thickened in the middle part, right ovary shows chronic cystic degeneration but is not much enlarged, left ovary has the same condition.

Operation. Appendectomy, supravaginal hysterectomy. The patient's temperature went to 100 a few hours after the operation but never went over 101.5 and returned to normal after four days.

SUMMARY AND GENERAL CONCLUSIONS

From a cultural study of 62 ovaries showing the changes found in fibrocystic degeneration and three in which the process was more acute the findings of the streptococcus viridans in 50 per cent of the cultures suggests that the streptococcus viridans is the most common organism associated with chronic ovaritis. Since the cultures from ten ovaries remained sterile, it would appear that chronic degeneration may result without the presence of bacteria or that the bacteria are gradually killed and the ovary rendered

sterile. The findings of the gonococcus in only one acute and one chronic ovary would seem to indicate that this organism may not be responsible for as much of the chronic ovarian disease as was formerly supposed. Although the Welch bacillus was found in small numbers in 33 per cent of the cases yet in the absence of any definite animal experiments it may be considered a more or less harmless invader still it must be remembered that this organism has been the cause of puerperal sepsis. The staphylococcus albus and the diphtheroid bacillus are regarded as accidental or harmless invaders since intravenous injections of each do not produce lesions in animals.

It has long been recognized that the chronic ovarian degeneration may follow acute infections of the ovary and this study shows that bacteria must also be regarded as the etiological factor in chronic ovaritis though it has developed without a definite history of an acute infection. The various conditions which cause passive congestion in the pelvis are to be considered as predisposing and not as etiological factors.

The not uncommon history of pelvic trouble following anginal attacks during the menstrual period, the occurrence of pelvic infection following immediately after tonsillitis, the discovery of chronic tubo-ovarian inflammation in a young woman with a congenital stenosis of the cervix and the uterus, with an imperforated vagina and the isolation of the streptococcus viridans from her left ovary together with the experimental production of ovaritis in animals seems conclusive proof that hæmatogenous infection of the ovaries occurs and that it may be responsible for much of the chronic ovaritis in which there is not a definite history of gonorrhœa or puerperal sepsis.

The find of bacteria, especially the streptococcus viridans in the greater portion of the ovaries cultured offers a logical explanation for the not infrequent recurrence of cystic swellings after resection of the ovary. It also suggests that the ligature or drainage through a single opening with Paquelin's cautery as practiced by Dr. Webster may be the method of choice since

the heat may kill the bacteria. This study also shows a probable reason why transplanted ovaries degenerate.

A study of the tissues together with a careful review of the histories gives no new or definite mean for choosing between a conservative and a radical operative procedure. Since some ovaries are sterile and many others contain only a few organisms, the writer believes that this study favors conservation of the ovaries whenever the operative findings will permit. In this series it was usual to find rather large numbers of streptococci in the ovaries of patients who came to a second operation. With a young woman it is better that she come to a second operation than to lose both ovaries the first time even if there is an equal chance that conserved tissue may degenerate.

The findings of bacteria in fifteen (eleven of which showed streptococcus viridans) of the eighteen degenerated ovaries associated with fibroids of the uterus suggests strongly that bacteria are likewise responsible for the chronic ovaritis so commonly associated with fibromyomata.

Since there appears to be very frequently some rather definite connection between the

more common form of chronic infection and ovaritis, it is evident that in treating a patient with ovarian trouble that any such foci should be located and removed. It would seem logical to believe that by the early detection and elimination of these primary infection it might be possible to lessen the occurrence of ovaritis.

I wish to acknowledge my indebtedness to Dr. J. Clarence Webster for his suggestions and the privilege of reporting his cases, and to Dr. E. C. Rosenow for his co-operation in this study.

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THE LEUCOCYTES IN PREGNANCY LABOR AND THE PUERPERIUM¹

By JOSEPH L. BAER, SM, MD, FACS, CHICAGO

AFTER Nasse had called attention to the existence of a true leucocytosis of pregnancy, numerous workers began checking his results at first with widely varying outcome but finally with sufficient unanimity to warrant the statement that there is a leucocytosis of late pregnancy, especially in primiparae.

The physiological leucocytosis of labor and the puerperium is generally accepted without debate but in clinical practice the question constantly arises: Is the leucocytosis in the given case physiological or pathological? To supply a working answer to this question and to establish a standard of

comparison for the leucocytosis and differential analysis of pregnancy labor and the puerperium the following study was undertaken at the suggestion of Dr. L. E. Frankenthal utilizing the material afforded by the Michael Reese Maternity.

The literature abounds with investigations of this kind and each worker has laid stress on the errors of his predecessor. For example, it is pointed out that counts should start on the pregnant woman and be carried through on the same woman in labor and the puerperium; that comparisons on different women at different periods introduce an avoidable error; that the figure of interest is the in-

crease in the leucocyte count over the normal for that woman not the actual count itself that the figures are complicated by the introduction of abnormal cases into the series that the influence of digestion was ignored etc.

Among the earliest views is that found in Virchow's *Cellular Pathology*. He states that there is a monthly increase in the leucocytes in pregnancy which is proportional to an increase in the lymphatics of the uterus, and an increase in the lymph nodes of the inguinal and lumbar regions.

Madame Mochatcheff did a novel piece of research in that she made comparisons between blood obtained from the portio vaginalls and the finger and found that there is a leucocytosis in pregnancy that blood from the portio contains fewer leucocytes than from the finger in pregnancy and that the reverse is true in labor.

Payr stated that there is an adenoid character to the whole endometrium, and hence in labor the leucocytes are squeezed into the circulation, thus raising the count.

Rieder examined 31 pregnant women from fourteen to sixteen hours after eating and found a range of leucocytes from 10,200 to 16,500 with an average of 13,000. In 50 per cent in multiparæ (18 cases) there was an increase among 13 primiparæ all but one showed an increase and during digestion in 6 cases there was a decrease.

Hofbauer constructed curves from 20 cases. The curve starts just above the normal goes up during and past labor dropping down soon after labor and reaches a level ten to twelve hours post partum which it maintains until the second to the third day of the puerperium, when there is a secondary rise associated with the incoming of the milk. He considered that the leucocytosis of pregnancy was due to the painless, rhythmical contractions that the first curve in labor was due to the work of the uterus, and the second curve to the activity of the breasts.

Willd examining 30 cases found an increase in the leucocytes in labor and explains the same by means of a comparison between the uterine surface and a wound surface. He states that the increase which continues into

the puerperium is due to the resorption of the uterine material.

Hilbard and White present the following conclusions: (1) Leucocytosis exists in three-fourths of all cases more often in primiparæ in labor. (2) In the puerperium the curve drops first rapidly then slowly to normal, rising a little on the seventh day. (3) Leucocytosis is greater in young women and less with each labor. (4) Prolonged labor causes an increase. (5) Breast infections produce a rapid increase. (6) Leucocytosis of labor is an increase essentially in the polymorphonuclear neutrophiles.

Bégoune thinks there is an increase in the last of pregnancy which involves only the ripe forms of the leucocytes the young forms are decreased. The first day post partum there is a marked increase in all forms. In the puerperium the polymorphonuclear neutrophils show a relative and absolute decrease. The eosinophiles are increased at the beginning of pregnancy decreased post partum and then increased steadily after the second day.

Nannicini found that there is no increase in multiparæ. The count stays within the physiological upper limit. There is a true leucocytosis of pregnancy in primiparæ. There is an absence of leucocytosis of digestion. The count is actually less during digestion.

Carstanjen says the neutrophils are increased in pregnancy and decreased during the puerperium. The lymphocytes are decreased in pregnancy and increased during the puerperium. The large mononuclears are always decreased. The eosinophiles are decreased post partum and then on the seventh day of the puerperium they are increased beyond the percentage found in pregnancy.

C. Hahl examined 36 normal cases in pregnancy labor and the puerperium. The leucocytes were slightly increased in the last days of pregnancy. With labor there was a considerable increase due to the neutrophils. Post-partum there was a gradual decrease reaching the normal in one to seven days. His comparisons showed with no contractions, no increase in leucocytosis with contractions, a marked leucocytosis. His explana-

Pre I socase	Labor	Post	1	2	3	4	5	6	7	8	9	10
Neutrophils	883	867	721	720	723	724	726	712	701	683	689	
Small lymphocytes	108	103	138	140	150	143	175	205	249	242	269	
Large lymphocytes	35	45	61	40	33	49	52	53	33	42	31	
Eosinophils	17	3	22	16	22	24	21	17	08	23	12	
Thrombocytes	03	1	02	08	06	05	03	05	04	05	3	
Mat Cells	05	4	06	6	6	05	03	8	5	06	6	

Pre II socase	Labor	Post	1	2	3	4	5	6	7	8	9	10
Neutrophils	777	792	721	720	717	726	685	694	663	672	693	
Small lymphocytes	163	128	193	175	225	218	231	25	264	663	378	
Large lymphocytes	41	52	41	59	30	31	52	46	36	52	31	
Eosinophils	05	11	26	21	2	14	23	13	28	16	05	
Thrombocytes	6	8	5	27	3	1	07	06	5	3	02	
Mat Cells	08	08	4	08	05	1	02	6	4	3	08	

Chart Leucocytosis in labor and puerperium. (Michael Reese Hospital.)

In the last three classes there is a secondary division into round parts and loops. Arneth examined 10 pregnant women 5 primiparæ and 5 multiparæ. In the primiparæ he found a count ranging from 7,800 to 11,000 in the multiparæ from 3,000 to 8,600. He found the neutrophile changes to be a displacement toward the left in other words, toward the first class of neutrophils, or so-called young cells. The smaller the total count, the more the displacement toward the left and he found the neutrophils to belong chiefly to classes two and three. In labor he examined six primiparæ and two multiparæ. All the total counts but one exceeded 10,000—as high as 18,100. The displacement of the neutrophils was still more to the left. In the puerperium there was a total decrease with the displacement back toward the right of the scale. On the third day post-partum

in the presence of lactation, no influence on the leucocytes was noted the count remaining unchanged, and the neutrophils remaining toward the left.

His explanation was that as in infections, there is a more rapid destruction of the leucocytes, resulting in an increase in the total and an increase in the young forms that is classes two and three but the destruction is not so severe as to cause the appearance of chiefly class one cells.

Hans A. Dietrich laid special emphasis on the fact that he used the Turk counter and the May-Gruenwald stain for differentiations. He analyzed 20 cases, carrying the same women through pregnancy labor and the puerperium, examining them every two weeks ante-partum, and he made analyses of the labor counts at various stages such as the rupture of the membranes, the beginning of

	Labor	Pa	TP	2	3	4	5	6	7	8	9	10	Duration hr. min.	Milk 2 3 4
Para I 30 cases	18655	19873	17469	15773	15007	18369	18520	13795	12033	10900	10600	19 25	7 13 9	
Para II 19 cases	14397	16766	14650	12420	12570	11450	10000	11770	12110	12000	9000	12 44	11 8	
Para III 15 cases	14520	16220	15930	12700	15440	12150	10530	11250	10800	10400	9000	11: 55	6 9	
Para IV 10 cases	13080	16800	14900	14800	12820	13200	9200	11500	11700	11200	10900	10 45	4 5 1	
Para V 5 cases	10850	12000	9400	10650	9210	8600	7400	10400	9800	10300	10200	10 44	2 3	
Para VI 3 cases	10467	11600	9600	7900	8000	8750	7250	6200	7200	9000	8600	7 50	1 1	
Para VII 8 cases	12200	11300	15900	10700	9200	9400	10467	9533	5800	7200	7600	11 46	1 3	
Para VIII 1 case	5700	7200	7400	7000	6200	6800	6000	5800	6600	7000	6900	6		

Chart Effect of multiparity (M had Reese Hospital)

pains the height of pains the birth of the head and daily post partum counts for eight days. All of this was done under identical external conditions the patients being in the clinic and all examinations being made three hours after the meal time. Dietrich maintained that there can be no fixed normal maximum in pregnancy such as the arbitrary figure of 10,000. Each individual has her own normal count. Hence he determined to state his figures in terms of increase or decrease in the individual case based on the low counts of pregnancy. On this basis he determined that at the end of pregnancy there is an increase over the normal in primiparae of 3,068 and in multiparae of 1,234. The increase is in the neutrophiles. The eosinophiles were decreased in 17 out of the 20 cases and there were no appreciable changes in the lymphocytes. In labor among primiparae there was an increase of 8,506 over the normal and in multiparae of 9,453 a maximum count of 34,200 — an increase of 18,500 and a minimum count of 16,400 — an increase of 2,600. The maximum point is reached just post partum. The contractions seem to increase the count. On differential examination it proved to be purely a polymorphonuclear neutrophilic increase. In 13 normal cases post partum there was a rapid fall reaching normal on the third day. The eosinophiles absent in labor reappeared on the first day of the puerperium and then

became more numerous than during the normal pregnancy. There was no relation to lactation or after pains that he could determine.

Dietrich offered as an explanation of the leucocytosis a comparison to the theory of eclampsia on the basis of toxins from the fetus and placenta. These toxins in normal cases call forth as neutralizers the neutrophils especially. Therefore primiparae have a greater number and multiparae have a certain immunity. Uterine contractions throw more toxins into the circulation hence more neutrophils appear from the bone marrow.

Possibly the work theory of Schultz offered by Hofbauer namely that increase in intra abdominal pressure results in a compression of the veins and an increase in the circulation time hence an increase in the leucocytes in the peripheral parts — in other words an apparent leucocytosis may be a part of the explanation.

S. Adachi studied the blood changes in pregnancy and labor. He pointed out that variations in healthy non pregnant women are marked. The figures given by various observers are: Moleschott 12,605 to 14,000; Mallasz 6,923 to 7,692; Duperie 4,090 to 4,545 and Senator 3,000 to 6,000. If there be such variations in the normal non pregnant counts the variations in the pregnant woman or in any unusual condition would

	Number cases	Lebor	Pharyp	2	3	4	5	6	7	8	9	10	Average Lebor
PART I													
Under 12 Hours	6	17333	16794	12824	13720	12620	9220	17440	13530	1120	10200	9220	8157
12-24 Hours	14	17730	17625	16701	17750	17750	15200	13760	17230	13650	8600	10770	18107
Over 24 Hours	10	19300	22460	17773	17250	15775	14720	12100	16000	12600	17700	14000	27137
PART II													
Under 12 Hours	11	17600	17700	15120	13470	12300	12000	9530	10700	10200	9000	8900	600
12-24 Hours	6	12100	11600	12600	11700	10000	10700	11000	10200	10700	13900	9000	1517
Over 24 Hours	2	17300	17300	15700	112	17720	17600	16500	17700	10650	17700	10300	2437
PART III													
Under 12 Hours	31	14550	15730	13715	13000	10700	10710	10530	10301	10720	10750	9000	6100
12-24 Hours	23	17710	15700	12100	10720	12300	11620	9800	10620	9710	10215	10015	1507
Over 24 Hours	9	17130	2210	9900	13400	17100	17000	7700	17700	17000	10770	10100	3005

Chart 3. Effect of duration of labor (Michael Reese Hospital)

therefore be proportionately greater. He considered as important factors the apparatus and technique condition of the subject, and the external factors. For apparatus, he used the Thoma-Zeiss counting chamber but preferably the Turck. Hemorrhage, fever, meal digestion exertion, were factors to be considered in the condition of the patient. Room temperature was a factor in that cooling seemed to increase the leucocytes, and vice versa. Adachi counted ten non-pregnant cases, in whom he found an average of 5,500 to 8,400 19 nine months pregnancies, in whom with the Thoma he found 6,800 to 12,600 and with the Turck, 4,960 to 10,530 and 14 cases in active labor from one half to five hours antepartum usually the second stage, in whom he found a range of 11,000 to 25,600 — in one case a 9,800 count. He found no increase in the ninth month of pregnancy over the non-pregnant state in this agreeing with Zangemeister and Wagner. He found a marked increase in labor proportional to the severity of the contractions. He counted 98 cases in all, omitting 30 for various causes making his total in all groups 68 cases. However he saw almost all his cases only once or

at most twice. His explanations are that in the ninth month of pregnancy there is no change in the leucocytes, erythrocytes or hemoglobin that in labor the leucocytes are increased proportionally to the contractions and he found no difference between primiparae and multiparae all of which conclusions are at variance with the findings of most other reliable observers.

W. Sieben analyzed 10 cases in labor and the puerperium. He was unable to make comparative counts on the same women through pregnancy labor and the puerperium. He found an increase in the ninth month of pregnancy and approved strongly of Dietrich's method of following the individual case through her pregnancy labor and puerperium, rather than the Adachi method of numerous totals from all possible sources. In labor he found a leucocytosis maximum of 21,000, minimum of 11,000 average of 17,000 with a constant decrease in the puerperium of all cases but two reaching the normal at the end of the second week. His differential analysis showed the neutrophils to decrease throughout the puerperium, and determine the general curve. The lympho-

cytes increased a little on the first or third day possibly in relation to infection. The eosinophiles were present in 50 per cent of the cases just post partum in which Sieben differs from most other authors who have found them absent—an increase throughout the puerperium or reaching a maximum on the third day. The neutrophils and the lymphocytes were found to be reciprocal the one increasing as the other decreased. In the mononuclear lymphocytes the transitional cells and mast cells no rule applies. His conclusions were (1) In labor there is an increase averaging 17,000. (2) There is a return to the normal in the second week. (3) In the differential analysis the polymorphonuclear neutrophils decrease steadily throughout the puerperium. The lymphocytes like the polynuclears decrease but may rise in a week to a figure greater than the labor total. This change occurs chiefly in the small lymphocytes.

As the small lymphocytes increase the large lymphocytes decrease. The eosinophiles were present in 50 per cent post partum and their curve was parallel to that of the neutrophils.

No single worker analyzed a sufficiently large series to establish a standard scale and the discrepancies between various investigators together with the varying conditions under which their results were attained made it seem impracticable to combine their figures even from only the more recent sources.

In this investigation single counts and differential analyses were made in 25 pregnant women (11 primiparae and 14 multiparae) one to four weeks before delivery and counts were made in a consecutive series of 100 ward cases in labor afterwards eliminating 13 because of fever (11 with one temperature of 100.2 or over and 2 with fever of several days duration). In each of these women a leucocyte count was made during active labor and once daily thereafter for ten consecutive days. Whenever possible the blood was taken in late forenoon late afternoon or at night i. e. when well removed from meal time. At the same time spreads were prepared for differential counts and the polymorphonuclear neutrophils were subjected to the Arneith analysis in an attempt to confirm his findings.

	Case	Labor	Puerp	1	2	3	4	5	6
Prim. I	7	17700	18700	8600	9600	11200	12300	12500	
5 th day	15	17700	8600	6700	4300	1700	2700	1700	1700
4 th day		16700	12000	7500	5700	5700	6000	1700	
5 th day	1	7000	3100	1500	1200	1700	4200	1700	
Prim. II	1	10000	15000	5000	1700	1200	1700	1700	1700
5 th day	8	14500	8600	1200	1200	1200	1200	1200	1200
4 th day	8								
Prim. III	1	17000	17000	12000	12000	12000	12000	12000	12000
5 th day	31	12000	3200	3000		2000	1200	2000	
4 th day	8	12000	14000	12000	12000	12000	12000	12000	12000
Prim. IV	1	12000	12000	12000	12000	12000	12000	12000	12000
5 th day	44	14000	17000	17000	17000	17000	17000	17000	17000
4 th day	8	12000	12000	12000	12000	12000	12000	12000	12000

(Chart 4. Effect of appearance of milk (Michael Reese Hospital))

In the last month of pregnancy the average count in eleven primiparae showed 10,909 or 2,909 above the mean normal of 8,000 (if we accept the normal range as 6,000-10,000). The multiparae (14 cases average 8,886) showed no change and the differential counts come very close to normal figures (Chart O).

Very early it was found that there is a striking difference between primiparae and multiparae a point little emphasized in the literature. In this series it is very noticeable (Chart 1). Among 30 primiparae the average labor leucocytosis was 18,255 and the average high point 19,883 was reached on the first day of the puerperium with a steady tapering off from that to the tenth day 10,840.

Among 57 multiparae (II para to VII para) the labor figure was 13,467 and the average high point, 15,062 again was reached on the first day of the puerperium then tapering to 10,467 on the tenth day.

With each successive childbirth there seems to be a decreased reaction on the part of the leucocytes a kind of immunity if you please and in this respect the single VII para was striking (Chart II).

The duration of labor proved less of a factor than had been anticipated a noticeable increase beyond the average leucocytosis

Para II Five year Groups	Number of Cases	Leucos	PMN's	2	3	4	5	6	7	8	9	10
18-20 years	8	19275	24900	17850	17900	16950	18723	19150	12600	14150	10200	10000
21-25	16	17905	17760	16166	15385	12890	12374	11600	10290	11400	10266	11600
26-30	5	16450	19223	18700	16600	16723	18900	19250	12200	12366	10233	11300
31-35	1	21600	22200	19600	18200	17700	20600	14000	10000	8600	11600	11200
36-40	3	18700	16200	19600	19000	16600	12600	12000	9800	10200	9900	11200
41-45	12	15217	18900	11700	10570	12833	8500	9867	9600	10200	9200	9000
46-50	22	13970	16520	12625	12733	13971	11400	2	10920	11200	11000	11100
51-55	18	15623	16030	16767	16267	12727	11520	10700	12150	11700	10200	9900
56-60	7	9123	9800	11400	10220	805	9133	15	8550	6700	8500	7200

Chart 5. Effect of age. (Michael Reese Hospital.)

occurring only in the primiparae in labor over twenty four hours (Chart 3)

The incoming of the milk seemed not to affect the leucocytosis, except possibly in the group of fourth day primiparae in which a secondary rise occurred on the third day and the single fifth day primipara, who reached her maximum count on third day (Chart 4)

Cases grouped on the basis of age, each group covering a five year period showed the most marked elevation in the leucocyte count among the eight primiparae aged 18 to 20. Among the multiparae there was nothing noteworthy except the group aged 36 to 40 seven in number in which there was the least reaction, explainable, however on the basis of multiparity rather than age (Chart 5)

The differential analyses are in accord with the findings of the more recent workers notably Dietrich and Sieben. The leucocytosis is of the polymorphonuclear type these elements reaching their maximum at the end of labor and on the first day post partum, then rapidly and steadily decreasing reaching normal proportions after five days in primiparae and three days in multiparae. The eosinophiles were absent in half the labor cases, reappeared in normal proportions on

the first day post-partum and at no time were noticeably increased.

The small lymphocytes were diminished as the polymorphonuclear leucocytes increased and the large mononuclear transitional forms and mast cells maintained normal percentages (Chart 6)

Classification of the polymorphonuclear leucocytes on the Arnet plan was carried out systematically and showed the displacement toward the left, i.e. classes 2 and 3 of which he speaks but this was not a constant finding

SUMMARY

There is a leucocytosis of pregnancy appearing in the ninth month slight in amount, and especially noticeable in primiparae

The leucocytosis of labor is marked in primiparae averaging 18,255 and is increased by a duration of labor beyond twenty four hours. It is less marked in II parae and is slight in III plus parae.

The height of the curve in primiparae and multiparae is reached on the first day of the puerperium, after which there is a rapid and constant decline to the tenth day at which time the curve is about at the normal level

	Lab r	Part 1	2	3	4	5	6	7	8	9	10	Sum H. M.	MILK 4 3 4
Part I 30 Cases													
Average	18253	19883	17049	15823	15007	14319	14900	13875	12033	10900	10870	19 25	7 13 9
High t	272	24900	21200	19600	19600	20600	21000	19900	16200	14000	13200	31 25	
Low t	11 00	14600	9900	14000	8900	8000	8200	9600	8600	8000	7400	7 10	
Part II 17 Cases													
Average	14387	16766	14690	13470	12650	11 50	10000	11870	1 820	10000	9 00	14 97	11 8
High st	22400	28200	22800	18600	16400	15000	13200	16900	15300	17900	16000	40 10	
Low st	7200	7600	8200	6200	6600	8000	8700	5900	9600	9900	7800	3 00	
Part III 57 Cases													
Average	18467	15062	12890	12014	11683	11070	99 7	10716	10233	10867	10467	11 26	29 31 2
High t	34600	28200	22800	18600	16900	15000	1420	16900	15200	17900	14900	40 10	
Lowest	5400	7600	7900	6200	6200	6200	6700	5900	6700	7700	7700	8 30	
Part IV 87 Cases													
Average	15080	16900	14923	13220	13060	12457	12037	10044	10687	10620	10600	13 07	24 24 2
Part V 17 Cases													
Average	13027	14210	11990	1174	11285	1020	9950	10440	10000	10800	11200	10 187	13 23 2

Chart 6 Differential analyses in per cent. (Michael Reese Hospital)

The onset of lactation does not influence the leucocyte count except that in the fourth day primiparæ there is a slight secondary elevation on the preceding day — about 1,500 to 2,000.

Age is not a factor except in primiparæ aged 20 years and under in whom the leucocytosis is higher than in any other group.

Differential analysis showed the increase in leucocytes to be chiefly in the polymorpho-nuclear neutrophils with a return to normal proportions by the third day of the puerperium an absence of eosinophiles in about half the cases in labor and their reappearance in normal proportions on the first day of the puerperium. The lymphocytes large and small mast cells and transitional types showed nothing unusual.

The Arnet analysis showed a displacement toward the left i.e. toward classes 2 and 3 but this was not constant and no pertinent deductions could be drawn.

To my chief Dr Lester E. Frankenthal I wish to express my deep appreciation of the privileges afforded me in the Michael Reese

Maternity Wards and for his helpful suggestions and invaluable criticisms in the carrying out of this work.

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PERITHELIOMA AND ENDOTHELIOMA OF THE UTERUS¹

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A CASE OF PERITHELIOMA OF THE UTERUS

IN October 1907 a tumor of unusual scientific interest fell into my hands. The clinical and pathological findings were these (33)

The patient a fragile, single woman, 65 years of age had been complaining of pain in the pelvic region for little over two months. She had visited many physicians of considerable ability who had made vaginal examination and had pronounced the condition "neuralgia of the pelvis." The patient was placed on a suitable course of treatment but without any amelioration of the symptoms. On the contrary the pain grew more severe and the patient was referred to me.

External. I found the woman anemic and thin almost to gauntness. Her skin was shrivelled and on the abdominal surface could be picked up in thin folds. It was sallow or paler yellowish in color. After considerable difficulty due to the extreme modesty of the patient I succeeded in making vaginal exploration when the following points were elicited. The vagina was small and undergoing senile changes. The vulvar mucosa showed the characteristic smooth, yellow appearance of senility. The uterus lay anteriorly was small although larger than would be expected from the age of the patient and was distinctly sensitive to the touch. There was very slight discharge from the os sanguineous, but without odor or any decided appearance of hemorrhage. At no time had the patient suffered from bleeding nor had she at any time noticed any odor or the small amount of leucorrhoea of which she complained. The history of the patient her age the condition of anemia, and the local signs impressed on me the importance of making microscopic examination of the intra-uterine curettings, and after considerable opposition this was finally agreed to. Under ether anesthesia the uterus was scraped at the patient's home and considerable quantity of debris obtained. The examination at this time confirmed the findings of the previous exploration, and also demonstrated the abnormality of the uterus and the healthy condition of the ovaries and tubes. The scrapings were sent to the distinguished pathologist, Dr. A. O. J. Kelly since deceased who reported that they showed an unusual condition of great malignancy which warranted the immediate removal of the uterus. He at this time pronounced the growth a perithelial sarcoma, the small tumor-cells showing an unusual degree of grouping around the vessel walls.

Operative. Two days later notwithstanding the general unfavorable condition of the patient, I removed the uterus and tubes, performing a pan-hysterectomy. This, at the urgent insistence of the patient was done at her home. I was ably assisted by Drs. H. A. Stocum, G. A. Kowles, and F. A. Faught and two skilled nurses. The operation was simple and uncomplicated taking not more than thirty minutes for its completion. The patient made an uninterrupted recovery for three days. Then symptoms of bowel-obstruction supervened, and despite the use of castor oil and other remedies and measures generally employed in this condition the patient sank steadily and died of adynamic ileus on the evening of the fifth day. Lavage was not resorted to on account of the age and feeble condition of the patient.

Pathologic part. Dr. Kelly's report of the pathological examination of the specimen follows. The scrapings consist of a new-growth made up of a framework of fibrous connective tissue supporting large cylindrical cells, with clear vesicular nuclei. The connective-tissue stroma is quite scanty and in some places altogether wanting. The tumor-cells, for the most part, are arranged radially about and attached directly to capillary blood vessels—whence morphologically the term perithelial sarcoma seems justified. In other places there is diffuse infiltration of the tissue—endometrium and musculature—by the tumor-cells. The uterus is rather small and reveals at the fundus a rough excrescence about centimeters in diameter projecting into the cavity and infiltrating the wall of the uterus to a depth of seven to ten millimeters. Microscopically the growth consists of a connective-tissue stroma enclosing epithelial cells arranged about the manner of the glands of the endometrium. In general this glandular arrangement is more or less well preserved, but in many places it is altogether wanting and the epithelial cells infiltrate the tissues irregularly as is common in this type of tumor.

This case is established therefore as one of the earliest recorded instances of perithelioma of the uterus—one of the rarer group of endothelial tumors.

THE ENDOTHELIUM AND THE PERITHELIOMA

In order to comprehend the difference and yet the very intimate relationship existing between the two groups of endothelial tumors about to be analyzed it becomes imperative to appreciate the exact anatomical variation

between the structures known as the endothelium and the perithelium

It was His (70) who invented the term *endothelium* for the flat cells composing the inner lining of serous cavities as well as of the blood vessels and the lymph vessels. These cells have a definite origin from the mesenchyma—a layer of the primitive mesoblast—as Courtauld (24) established by his investigations of the newly forming blood-capillaries in very early placental tissue. Courtauld proved conclusively that the endothelial cells originate in the loose connective tissue of the chorionic villi and that the epiblastic layers have no share whatever in the process. It is obligatory therefore that neoplasms originating from these cells must be grouped with the mesoblastic growths side by side with the sarcomata whatever their histological appearances may be. They must be sharply differentiated from the carcinomata notwithstanding their many points of resemblance to that group of tumors. Because of their phylogenesis Lazarus Barlow (97) remarks that such tumors must be expected to show as they do a great variability of appearance ranging between that presented by a typical spheroidal cell carcinoma on the one hand and a typical sarcoma on the other. While both sarcoma and endothelioma therefore have their origin in the mesenchyma it is probable that the sarcomata arise at an earlier and more primitive stage of mesenchymal development as is proved by their earlier clinical appearance that is in children and patients of tenderer years.

In describing the endothelium Lazarus Barlow (96) states that normal endothelial cells are regularly arranged are flattened and round with a large round or oval nucleus and with a large amount of protoplasm to the cell. As a rule the chromatin is collected round the periphery of the nucleus and also in the center while strands of chromatin extend between the two. Hence in section the nucleus is remarkable by its clearness and its appearance of vacuolation. Mallory (112) adds that the endothelial cell is characterized by no production of fibrils hence it stands out in marked contrast to the neuroglia cell. These endothelial cells are found in

special regions notably in the blood vessels the lymphatics and the lymph spaces.

The *perithelium* on the other hand is the layer of endothelial cells which surrounds the capillaries and smaller blood vessels that is the external boundary or adventitia of the vessels running through the perivascular spaces but not the cells forming the external wall of these spaces. Eberth and Iwanoff (35) in 1870 first described the perithelium in the vessel of the pia mater and demonstrated them by staining with silver nitrate. Zeit (196) who in this country has probably most thoroughly studied these tissues emphasizes the fact that the perithelial membrane must be differentiated from the *perivascular lymph spaces* of His (70) which that anatomist described as surrounding the adventitia of arteries veins and capillaries of the central nervous system (which has no lymph vessels). The perithelium Zeit repeats is the outer lining of the adventitia of blood vessels outside of which is the perivascular lymph space. In 1871 von Ehner (36) described the perithelium in the vessels of the pineal gland the suprarenal capsules the thymus gland and the salivary glands. Waldeyer (192) and Sertoli (166) in 1868 described it in the vessels of the coccygeal gland and Palt auf (127) in 189 reported its presence in the carotid gland.

THE HISTOLOGIC FEATURES OF PERITHELIOMA AND ENDOTHELIOMA

As is true of all other tissues it is possible for neoplasms to develop from these delicate membranes. Stolz (146) calls attention to the fact that Golgi as early as 1869 first spoke of an *endothelioma* as a growth originating from endothelial cells while Kolaczek (84) in 1878 made the first great analytical study of endothelial tumors and recognized the condition as belonging to the group of angio-sarcomata. Marchand (113) and Weichselbaum in 1879 carried on these investigations both regarding the endotheliomata as tumors *sui generis*. Maurer (116) in 1890 gave the name *perithelioma* to the endothelial tumors arising from the adventitia of the blood vessels. Finally Ribbert (149) in 1901 stated that the endothelial tumor arises

ing from the blood vessels is a very rare growth—much more so than that arising from the lymph-channels and this observation is verified by the summary of all recorded endothelial tumors accompanying this paper.

It is unfortunate that there has been some confusion in the employment of these terms. The following résumé may aid in elucidating the matter. Under morbid stimulation endothelial cells wherever found will proliferate and this proliferation may take place inwardly or outwardly or in both directions at the same time. In the words of Lazarus Barlow (96) who with Bayon (11) the English pathologist has given this subject exhaustive attention. Outward proliferation will lead to the production of a central space lined with endothelial cells, and surrounded by two three or many layers of cells, more or less regularly arranged, and with characteristic nuclei. Such a growth springing from the adventitia of a blood vessel is designated a *perithelioma*. The important point to note morphologically is the persistence of the central lumen. Lazarus-Barlow believes that this characteristic feature is doubtless due to the greater rapidity with which the blood flows through the capillaries together with the high hemal tension both of which militate against cellular proliferation inward. His conclusion that because of these physical peculiarities enthelomatous growth should be more common in the case of lymphatics and peritheliomatous growth in the case of blood vessels is verified clinically and by the histological findings of all recorded endothelial tumors. It must be admitted however that it is difficult in some cases to definitely conclude where the growths originated, although the presence of red blood-corpuscles in the lumina of peritheliomata will usually determine their origin from the blood vessels.

If adds Lazarus-Barlow the growth shows lumina containing a fairly circumscribed mass of albumin which has undergone coagulation in the process of fixation and has given rise to fibrin and a certain amount of granular debris the growth has probably originated in a lymphatic.

If on the other hand, the proliferation of

the endothelial cells takes place inwardly the central space lined with endothelial cell will become choked with a mass of cells. Such a growth is known as an *endothelioma*.

According to these two hypothetical methods of growth continues this pathologist

It should be possible to divide the endotheliomata into the *peritheliomata* and the *endotheliomata*. Further if the perithelioma process occurs in different situations but in close contiguity the effect will be that of a number of spaces each more or less closely resembling the original space but separated from one another by a mass of cells produced by the outward proliferation and coalescence of the endothelial lining. On the other hand, in a growth of the endothelioma type a number of cell masses will be seen corresponding to normal lymphatic spaces in which the lumina have been distended and filled with cells and which are separated by ordinary connective tissue. A combination of the two processes may occur leading to a type of growth that may fairly be called a *perienthelioma*.

To this distinction Bayon (11) adds that all growths presenting a radial disposition of cells around blood vessels the endothelial lining of which is intact may be termed *peritheliomata* even if it cannot be conclusively shown that they originate from the perithelium, that is from the endothelial cells covering the adventitia of the blood vessels.

HISTOLOGIC CONCLUSIONS CONCERNING ENDOTHELIAL TUMORS

As a primary corollary then it may be stated that both endotheliomata and peritheliomata are in reality endothelial tumors that is taking their origin in endothelial cells and secondly that they are more or less motely still very closely allied to if not constituting a true variety of sarcomata. More over from a morphologic standpoint, it is evident, from the foregoing analysis that it is admissible to use the expression *peritheliomata* to designate only a peculiar class of the growths springing from the delicate external layer of cells around the minute blood vessels and showing the characteristic radial disposition of the tumor-cells which

according to von Hanseemann (60) is due to the growth cells being more readily nourished in that position. The characteristic cellular proliferation begins at the external wall of the vessel and not in its lumen as in simple hemangio-endothelioma but they are not as Barbour (10) claims in reality endotheliomata derived from the lymphatic. Zeit (198) emphasizes this distinction when he remarks it is wrong to speak of a *perithelioma* as arising from a lymph vessel because perithelial membranes cover the outer surface of the adventitia of blood vessels only in a one-cell layered mosaic of flat endothelium like cells. They have only been found with blood vessels of certain organs called perithelial organs. A perithelioma cannot therefore be spoken of as arising from lymph vessels nor from blood-capillaries. The term *perithelioma* is confined to certain tumors of the blood vessels of perithelial organs only. Yet so-called perithelial tumor or angiosarcomata do occur in nonperithelial organs which are morphologically similar to the true peritheliomata. From a histogenetic point of view it is desirable that the term be reserved for a class of tumors arising from perithelium only.

With this reservation Zeit concludes. In order then to arrive at a histogenetic classification of these tumors we would have to be able to distinguish whether the proliferation of cells had their origin in the true perithelium of blood vessels which lines the outer surface of the adventitia in perithelial organs (*perithelioma*) in the inner or both endothelial layers of a perivascular lymph space or in the adventitia cells or perivascular cells of blood capillaries. Pick (134) and Rosthorn (155) call all these endothelium like layers *perithelium* and their proliferation a *perithelioma*. Borst (10) also wants to use the name perithelioma for all these tumors with the understanding that it is a kind of offspring of endothelioma. In case one is able to prove that the growth originated from the endothelium of the perivascular lymph spaces it should be called *endothelioma perivascular* (Borrmann's (18) *periendothelioma*). Borrmann thinks he can distinguish morphologically between the two types as follows *peri-*

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THE CLINICAL ANALYSIS OF ENDOTHELIAL TUMORS

With this hasty summary of the histological distinctions between the two groups of endothelial neoplasms it is interesting to proceed to an analytical study of the clinical peculiarities of these tumors with special reference to their occurrence in the female generative organs. An exhaustive investigation of endothelial tumors was made by Rudolph Volkmann (190) in 1895 and more recently by Max Borst (20) in 1902 while Zeitschmann (100) has presented an exceedingly interesting treatise covering the recorded information up to 1904 concerning perithelioma as occurring in lower animals.

At the most not more than 300 endothelial tumors of all kinds have been recorded to date in the various portions of the human body. It must be conceded therefore that they are among the rarest of neoplasms although it is probable as Roussy and Amicville (156) have claimed that they are commoner than would appear and that many cases were formerly described as angiosarcoma and angiosarcoma plexiforme.

Any part of the body may be attacked by the growth. The commonest sites of surgical interest according to Carless (6) ap-

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pear to be the skin testes, throat, the parotid and submaxillary glands, the neighborhood of the mouth and cheeks the long bones, and the carotid gland. Other regions in which authentic cases have been noted are the eyelid the optic nerve the soft palate the pelvic connective tissue the brain the subcutaneous connective tissue, the muscles the kidney the mamma, and certain serous membranes as the pleura. Wherever occurring these tumors show a marked tendency to undergo hyaline degeneration.

In their relation to sex Carless states that endothelial tumors are slightly more common in women than in men. Karsner (77) endorses this statement. Age exerts a decided influence upon the growth. Only 16.13 per cent of the cases occur before the age of 40 and 73.87 per cent after that age. Karsner claims that the disease appears particularly in the fourth fifth and sixth decades of life that is between 31 and 60 years of age.

About one-third of all the recorded cases have occurred in the female generative organs. Thus Lange (94) up to 1903 collected over 40 cases of endothelioma of the ovary. Since then additional cases in the ovary have been reported by Godart (54) Lincoln (106) Schuermann (163) Federlin (40) Papafannou (128) Heinrichs (65) Procopio (141) Kubo (92) Carl (25) Eymier (39) and Ligabue (103). Perithelioma of the ovary is much rarer but fifteen cases in all having been recorded by Steinhaus (175) Burckhard (24) Krukenberg (90) Menetrier (117) Graefe (56) Pollak (139) Mirabeau (121) Göth (55) Uffreduzzi (184) Neumann (125) Amann (5) Bender and Proust (14) and Barbour and Watson (10). Karsner (77) records a case of primary endothelioma of the omentum. Schmidlechner (162) a case of perithelioma of the labia majora and Barbour and Watson (10) a case of perithelioma of the fallopian tube.

ENDOTHELIAL TUMORS OF THE UTERUS FROM THE CLINICAL POINT OF VIEW

Macnaughton Jones (109) correctly remarks that it is only within recent years that uterine endothelial tumors have been de-

scribed. Comparatively few of these cases are on record and this is especially true of perithelioma but, as Watson (193) has remarked the condition cannot be so rare as the small number of cases indicates. Many of them have been described as sarcomata and many others occurring as secondary changes in fibroids have not been recognized at all. In a large percentage of the cases the tumor has arisen in a pre-existing fibroid, or has itself formed a large tumor in the uterine wall which has been mistaken for a fibroid. A few of the cases, as Watson's and my own were unassociated with perceptible tumor formation having apparently originated in the corporeal mucosa. Now that the existence of these tumors is becoming more generally recognized as well as their intimate association with a pre-existing fibroid change in the uterus, it is very probable that a progressively larger number of endothelial tumors will be placed on record in surgical literature. It is at least suggestive as Lazarus-Barlow (96) states that in the Mid-dlesex Hospital in London where a careful pathological examination of every tumor is made during the period from 1900 to 1904 endothelioma constituted 10 per cent of the malignant tumors of the uterus.

I have been able to gather from the literature just 50 cases of endothelial new formations in the uterus of which 18 were of the peritheliomatous type and 32 endotheliomatous. These are grouped in the tables which are appended with the exception of Svoboda's (177) case of endothelioma of the cervix and Szernyński's (178) and Zembruski's (199) cases of perithelioma, the records of which were not accessible. It is interesting to note that two of these cases occurred in the work of members of this Society. It is to be regretted that the clinical and pathological reports of some of these cases are very incomplete but even so a critical review of the cases elicits interesting and suggestive points. Thus the tables verify the claim already made that endothelioma is much more frequent than perithelioma—about in the proportion of 2 to 1.

Age. The average age of all the cases was 46 years. Perithelioma seems to develop a little later than endothelioma the cases

averaging 48 $\frac{1}{4}$ years while the average age of the endotheliomata was 43 $\frac{3}{4}$ years

The social relations of the patients are not recorded in 11 cases. Seven of the women were single and 29 were married with from none to nine children. One of the women was but 18 years of age another 19 and a third 27 the rest were 30 and older the oldest woman being 68 years of age the next oldest 65 a third 64 and two 62 years old. Sixteen of the women were 50 years old or more. As two-thirds of the women with uterine sarcoma are below the average in child bearing have not reached puberty or have not borne children for a long time a striking clinical difference will here be noted between uterine sarcomata and endothelial tumors.

Symptoms. Bleeding at times amounting to flooding at times merely a slight show is a very persistent symptom only 5 of the cases giving no such history. At a later period in the course of the disease these women would probably have developed the symptom. Generally the clinical manifestations are those of malignancy—bleeding febrile purulent discharge and pain—or those of fibroid tumor—bleeding with a decided tumor mass or uterine enlargement. The cases give a death rate of 29.9 per cent, including the primary mortality—17 per cent—and death from later complications and recurrence.

Site of the tumor. Of the peritheiomata but one originated in the cervix while of 31 endotheliomata the location of which are noted 16 slightly over half sprang from the cervix—7 from the posterior lip 4 from the anterior lip and 5 from the cervix generally without special localization. But 2 endotheliomata developed in the fundus and right cornu while 1 were located in the corpus 2 involving the posterior wall and 10 the interior. Six of the peritheiomata originated in the fundus and 10 in the body of the uterus. It would appear therefore that endotheliomata preferably develop from the cervix and peritheiomata from the uterus itself.

corpus uteri and Shaw (167) in 1913 both call attention to the frequency with which these endothelial growths in the uterus occur in association with or actually within the tissues of fibromyomata and especially when there has been no pre-operative suspicion of malignancy. Shaw remarks that this may possibly account for the few cases recorded many doubtless being thrown away as fibromyomata without microscopic examination. Of the tabulated cases 19 were associated with fibromata or fibromyomata while in 23 cases no such tumorous formation was noted. All the fibroid tumors which had undergone the malignant degeneration were located in the body of the uterus thereby substantiating the claims of Montgomery, Weir Williams and others that sarcoma of the body of the uterus is more common than sarcoma of the cervix.

In 1860 C. Mayer first described uterine sarcoma his case being termed by him a sarcomatous polyp. The occurrence of sarcomatous change in fibromyomata was first clearly described by Virchow (187) in 1862 who pointed out the origin of these tumors from the connective tissue of the myoma. In 1867 G. Veit first described sarcoma of the cervix. Finally Geist (52) in 1913 while speaking of malignant changes in uterine fibroids with special reference to the histogenesis of sarcomatous change in these tumors remarks: "The interstitial tissue of the myoma and the adventitia and endothelium of the lymph and blood vessels have been recognized and accepted as sites of origin of sarcoma. To these must be added the muscle cells proper [of a myoma]." Leith (98) adds suggestively: "We thus have a variety of sarcomatous growths arising within fibroids—the endothelioma the peritheioma the myosarcoma and the myoma sarcomatodes which may be the explanation of the relatively low degree of malignancy exhibited by most of these growths. Those originating in fibroblasts though varying greatly in malignancy show it in greatest degree whilst the myosarcoma is the least malignant of all the other two forms showing varying intermediate degrees." Bayon (111) confirms this view as to the relatively low degree of malignancy of

THE ASSOCIATION OF ENDOTHELIAL TUMOR WITH OTHER NEOPLASMS OF THE UTERUS

Leith (98) in the Ingleby Lectures for 1910 upon the pathology of tumor of the

endothelial tumor stating that metastases are not at all frequent with these tumors which is diametrically opposed to the general expectation when there is taken into consideration the extreme vascularity of the tumors, their intimate approximation to the blood vessels, and their multiplicity of small cells. They are however he adds, characterized by infiltrative and rapid expansive growth but on complete and thorough operative procedure do not show a tendency to recur

CONCLUSIONS

The following deductions may be drawn from this pathological and clinical review

1 Endothelial tumors of the uterus develop late in life—much later than sarcomata—the peritheliomata generally occurring at the most advanced age.

2 These growths are especially prone to occur in a pre-existing neoplasm—a myoma or a fibromyoma

3 While showing a high degree of local malignancy they but rarely give rise to metastatic deposits elsewhere

4 It is probable that endothelial uterine tumors occur more frequently than would appear Hence the importance of early removal of all uterine growths which should always be subjected to a careful pathologic examination.

TABLE OF ENDOTHELIAL TUMORS OF THE UTERUS

(Chronologically arranged)

PERITHELIOMA

CASE 1. Reported by Mary Scharlieb Med Press and Circ March 5 906 p 335 Patient aged 44 single pregnancy *Clinical history* Flooding three years ago cured. For last six months increasing menorrhagia no pain. Flooding from November 3 905 Uterus slightly enlarged. Slightly irregular Small nodules, best felt per rectum. Operation November 6 905 *Macroscopic find* 1 Uterus slightly enlarged Small fibroid tumors upon fundus and posterior wall Mucous membrane shows circumscribed area of malignancy *Microscopic find* 2 Uterine muscle not invaded by glandular tissue. Diseased endometrium shows tubules of cells, actively proliferating Growth springing from outer wall of blood vessels Supravaginal hysterectomy Recovery

CASE 2. Reported by Mary Scharlieb Ibid. Patient aged 50. IX-para, youngest child sixteen years. *Clinical history* Menstrues regular till end of 904. Since then free discharge, recently blood-stained For three months large hard tumor felt in abdomen Frequent micturition. Large hard tumor felt in abdomen Irregular Os patulous with papillomatous mass protruding Operation, No-

vember 905 *Macroscopic findings* Uterus and appendages weigh 3 ounces. Uterus size of 4½ months' pregnancy 6¼ inches long 4¼ inches wide, outer surface smooth Cervix much enlarged Growth has perforated left side of uterus, and projects as irregular mass into left broad ligament tumor involves anterior lip of cervix. On section solid tumor fills cavity extending into the cervix attached to anterior wall mass measures 3 inches in antero-posterior diameter Posterior wall of uterus lined by much thinner but very irregular layer of growth Tumor firm uniformly glaucous-white color, cavity of uterus, 9 inches long *Microscopic findings* Sections of tumor show columns of cells embedded in connective tissue Columns have central cavity containing blood not lined with endothelium This is bounded by vascular wall of varying thickness, which is surrounded by thick layer of tumor cell giving the appearance of growth composed of collection of vascular tubes, the outermost cells of which are formed by masses of tumor-cells. Cells have large amount of protoplasm round deeply staining nuclei and nucleoli The amount of lateral tissue varies Supravaginal hysterectomy Recovery but continued growth of tumor

CASE 3. Reported by E. H. T. Reedy T. Roy Acad. Med. Ireland, 907 vii, 3 7 also personal communication Patient aged 34. II-para. *Clinical history* Operation, 906 Pain in abdomen and back. Slight leucorrhoea. Menstruation normal Losing flesh for years and half *Macroscopic findings* Uterus uniformly enlarged, with some fibroid induration Certain small nodules lie under the peritoneum Malignant tumor situated in fundus Peritoneum studded with small nodules *Microscopic find* 1 Sections of nodules show masses of fairly large flat cells, arranged in somewhat columnar manner and infiltrating the muscle bundles. This condition is quite general over the whole fundus Supravaginal hysterectomy Death on the following day

CASE 4. Reported by G. F. D. Smith J. Obst. & Gynec., Brit. Emp. 908 xiv 35 Patient aged 35 Single. *Clinical history* Irregular bleeding for five months. Uterus small freely movable Operation, July 30, 906. Double ovariectomy in 904. *Macroscopic find* 1 Uterus small 3 inches long ½ inches internally; external surface normal From the fundus projecting down and into the cavity is soft, friable growth paler than the surrounding mucous membrane. *Microscopic find* 2 Tumor-cells slightly elongated in shape springing from the periphery of the smaller vessels. Areas of necrosis. Tumor-cells infiltrate the uterine muscle to the point of attachment of the growth. Total hysterectomy Recovery

CASE 5. Reported by W. A. A. Dorland J. Am. M. Assn. 908 li, 7 Patient aged 65 Single. *Clinical history* Pain in pelvis for 12 months Uterus slightly enlarged anterior Slight leucorrhoea, sanguinolent, odorless No bleeding Operation, October 907 *Macroscopic find* 1 Uterus not much enlarged At the fundus rough excrescence, centimeters in diameter, projecting into the cavity and infiltrating the uterine wall to depth of 1½ centimeters. *Microscopic find* 2 Section of growth shows connective-tissue stroma enclosing epithelial cells, arranged after the manner of the endometrial glands. The scrapings consist of framework of fibrous connective tissue, supporting large cylindrical cells with clear vesicular nuclei. These cells are arranged radially about and attached directly to capillary blood vessels. Panhysterectomy Death on fifth day from adynamic ileus.

CASE 6. Reported by Dornin and Lockyer Proc. Roy. Soc. Med., vol. li, Obst. and Gynec. Sect. 908 Oct., p. 5

Patient aged 49. 1 para. *Clinical history* Abdomen enlarged for seven years. Birth 54 inches. Occasional irregular bleeding. *Macroscope and ng* Fibroid uterus associated with fibroma of right ovary—weight 5 pounds. Uterus six of two fists. (a) Fibroid tumor as large as the uterus springing from the fundus. *Microscopic* Section of tumor shows small round cells lying in close connection with numerous blood vessels and appearing to arise from their outer coats. These cells resemble sarcoma cells. The blood vessels have fairly thick walls and are in no sense embryonic like the blood vessel of ordinary sarcoma. *Hysterectomy* Recovery. No recurrence.

Case Reported by Doran and Lockyer. *History* Patient aged 40. 11 para. *Clinical history* Abdomen enlarged 15 months. Menstruation profuse and irregular. *Macroscope and ng* Multinodular fibroid tumor of uterus—weight 5 pounds. A peritubal mass on the uterine wall left half plain tube mesosalpinx left and a cystic tumor springs from left side of uterus. *Microscopic* Section of tumor shows a serous small smooth pea-like cells springing from the endometrium of the blood vessels. These lie in large or small collections in all color places among the muscles of the uterus and tube. These cells resemble in size, shape and staining characteristics the cells of the lymphomatous sarcoma of the endometrium. *Hysterectomy* Recovery. No recurrence.

Case 8 Reported by J. Ewing. *Proc. N. Y. Path. Soc.* 1909. Vol. 85. Patient aged 48. Married. *Clinical history* Menopause 3½ years ago. There was irregular bleeding at times profuse. Three months later a foul discharge. Uterus enlarged, tender, os patulous. Large polypoid tumor felt in uterine cavity. *Macroscope and ng* Solid round polypoid tumor, 6 cm. firmly adherent to anterior wall, uterus small. Section streaked with extensive necrotic areas. *Microscopic* Section of tumor shows structure distinctly that of hypernephroma. Polyhedral cells in close apposition with well defined borders, clear granular cytoplasm and vesicular nuclei, size 5 to 30 microns. Near the blood vessels the smaller cells predominate. Mitotic figures with well preserved nucleoli are very numerous especially in the deeper portions near the muscularis. No sinusoids and no villi are found. *Hysterectomy* Recovery.

Case 9 Reported by R. F. C. Leith. *J. Obst. & Gynec. Brit. Emp.* 1914. Vol. 47. Patient aged 45. Married. Nullipara. *Clinical history* Menopause at 42. At 39 was tapped for a cystic abdominal tumor and thirteen months later an abdominal section but the growth was not removed because of adhesions and collapsed condition. At 44 increasing abdominal swelling, incontinence of urine. Tumor filled pelvis and reached to umbilicus. *Macroscope and ng* Uterus contains three tumors, the largest in anterior wall (almost entirely converted into cyst) other two solid. Cyst wall composed of sarcomatous elements, solid tumors sarcomatous. The large cystic growth was probably the primary tumor. *Microscopic* Section shows typical perithelioma cells, irregular in shape and size and of an active vegetative type some with several nuclei particularly those bordering upon the walls of the numerous capillaries. The young round cells are clustered close to the endothelial lining of the capillaries—suggesting their origin either from the endothelial cells of the vascular lumen or from the perivascular lymphatics. *Hysterectomy* Recovery.

Case 10 Reported by A. H. F. Barbour and B. P. W. *Am. J. Obst. & Gynec. Brit. Emp.* 1919. Vol. 6. Patient aged 38. 11 para. *Clinical history* Menopause at 48. 11½ five months. Fetid bluish leu-

rogen later blood stained and watery. Tumor attached to uterus. Six of five months pregnancy firm slightly tender uterus freely movable, os patulous, tumor palpable within. *Macroscope and ng* Uterus uniformly enlarged, no adhesions, irregular ovoid shape six inches vertical diameter 4 inches transverse. Tumor grows from fundus upper two-thirds of anterior wall and upper half of posterior wall. Lower pole projects free into uterine cavity. At fundus muscular wall reduced to a mere shell. Section of tumor yellowish white resembling brain tissue in appearance and consistency. Through it many hemorrhages most marked near fundus in this region necrotic area. *Microscopic* Section shows toward uterine wall islands of tumor cells, staining like a blood vessel with no endothelial coat but the other parts replaced by radially arranged cells of irregular outline each containing a large deeply staining nucleus, most of cells lie at right angles to lumen of vessel. In some parts there are appearances suggest e of the origin of these cells from the lymph channels, small spaces being habitable with the cell grouped around them. *Hysterectomy* Recovery. No recurrence.

Case 11 Reported by A. H. F. Barbour. *J. Obst. & Gynec. Brit. Emp.* 1913. Vol. 61. Patient aged 61. Single. *Clinical history* At 55 large loughing fibrous polyp with a thick pedicle projecting from vaginal orifice removed. Well until then began to fail. No pain. Gradually increasing abdominal swelling till size of seven months pregnant. Cystic feel. Uniform surface. *Macroscope and ng* Tumor 23 centimeters long 4 centimeters wide in long entire uterus from its lower pole projects the cervix. Bluish color, soft consistency, contains a large cystic cavity over anterior wall of which stretches the uterine cavity with its walls thinned out, length of uterine cavity 20 centimeters. About the middle of the posterior cavity is the remnant of a septum. Cyst wall thin lined with a layer of soft caseous matter which at lower posterior portion of cyst projects as a growth into cystic cavity. *Microscopic* Cyst walls show the structure of a uterine fibroid. Cavity lined with soft yellowish white necrotic tissue which shows peritheliomatous change. Several small vessels lie in a loose cellular stroma from their walls there is a definite cellular proliferation extending in the form of columns out to the stroma. *Hysterectomy* Recovery.

Case 12 Reported by W. F. Shaw. *J. Obst. & Gynec. Brit. Emp.* 1913. Vol. 62. Patient aged 40. Multipara. *Clinical history* Menorrhagia and metrorrhagia for two years. At 44 fibromyomatous polyp size of egg protruding through cervix removed. Two years later severe hemorrhage. Another egg sized polyp protruding from cervix. Patient anæmic. *Macroscope and ng* Uterus but slightly enlarged. Polypus of a dark color, invariable size of small orange springs from uterine wall, fundus cavity. *Microscopic* Section of tumor shows it to be a fibromyoma extensively invaded with perithelioma, the large cells of which are collected radially round the blood vessels. The uterine wall is not invaded. *Hysterectomy* Recovery. No recurrence.

Case 13 Reported by B. P. W. *Am. J. Obst. & Gynec. Brit. Emp.* 1914. Vol. 80. Patient aged 58. Primipara. Thirteen years last re. *Clinical history* Menopause at 47. No bleeding until 5. Then watery discharge occasionally streaked with blood, intermittent in character. Nine months later curetted. Scrapings showed malignancy. Two weeks later operation. *Macroscope and ng* Uterus 3 inches long 2 inches wide, peritubal uterine face normal. At its inner posterior wall is a small irregular projection on mucosa, 1 centimeter broad and 1 centimeter long. Rest of mucosa healthy. *Microscopic*

findings. Scrapings show large cells of epithelioid character arranged in rows, and in one or two places arranged radially to a vessel-lumen. Section of tumor shows typical perithelioma parts of growth necrotic, but greater part consists of masses of large cells arranged radially to lumina of blood-vessels. The growth is confined to the mucosa. In which small atrophied glands are visible. Base of growth infiltrates the superficial musculature. Here the cells form somewhat irregular columns and masses. Vaginal hysterectomy. Recovery. Subsequent developed squamous epithelioma of anterior vaginal wall near urethra, involving both sets of inguinal glands. Death.

CASE 4. Reported by F. W. N. Hautahn, *J. Obst. Soc., Edinb.* 924, xxvii, 33 also privet communication. Patient aged 32. *Clinical history.* Much pain in back slight menorrhagia. Ragged irregular condition of cervix, simulating carcinoma. *Macroscopic findings.* Uterus normal. Cervix shows growth involving cervical wall. *Microscopic findings.* Characteristic perithelioma. Vaginal hysterectomy. No recurrence.

CASE 5. Reported by F. W. N. Hautahn, *Ibid.* *Macroscopic findings.* Uterus seat of tumor involving corpus. *Microscopic findings.* Characteristic perithelioma. Hysterectomy. Recurrence in three or four months.

CASE 6. Reported by Mrs. F. E. Willey Proc. Roy. Soc. Med. 33 vii, Obst. and Gynec. Sect. 397. Patient aged 45. *Single. Clinical history.* For three years increasing menorrhagia. For six months recurring abdominal pain no leucorrhoea. Uterus size of 3½ months' pregnancy not tender. Appendages normal. Cervix healthy and nullipara. *Macroscopic findings.* Uterus 4 inches long and 4 inches wide outer surface normal. Posterior wall large white tumor 3 inches in diameter projecting into cavity fluctuating of consistency of fat, white in color degenerated in spots resembling coagulated serum. Edge of growth not well defined from uterine tissue. Strands of fibrous tissue from capsule of teraie all extend into tumor. Near the fundus the growth involves the uterine muscle. The endometrium is normal. *Microscopic findings.* Uterine wall invaded by masses of deeply stained tumor-cells these resemble sarcomatous tissue the cells are spindle-shaped and are anormally arranged. At places the entire tissue is composed of closely packed cells, with little intervening tissue. In other spots the cells are arranged in narrow channels, suggesting small empty capillaries and in other places the growth has the structure of perithelioma, being formed of thick walled tubes with central lumina. Subtotal hysterectomy.

II. ENDOTHELIOMA.

CASE 1. Reported by J. A. Amann, *J. Inaugural Dissertation, Muenchen*, 80 p. 5. Patient aged 35. VI para. *Clinical history.* Five years profuse yellowish white leucorrhoea. For 12 months pain in abdomen and back. No bleeding save last period of fourteen days. *Microscopic findings.* Tumor size of hazel ut on thickened posterior lip of cervix, consistency dense surface gray ragged. *Microscopic findings.* Tumor springs from deeper layer of cervical mucosa—from the endothelium of the lymph-vessels and lymph-channels. It consists of connective tissue stroma in which are numerous anastomosing cells, strands and masses rich contain central lumina. Removed by thermocautery. Recovery. No subsequent report.

CASE 2. Reported by J. McFarland, *Med News*, 894, iv p. 63. (From practice of D. C. P. Noble.) *Macroscopic findings.* Uterus shows large ragged ulcerating fibrous tumor projecting from the upper posterior surface into the uterine cavity circumscribed with broad pedicle almost continuous with the terine all. *Microscopic*

findings. Tumor substance unstriped muscle-tissue mixed with much fibrous connective tissue. Scattered throughout are occasional pale lies of uniform small round cells, irregularly arranged, but extending indefinitely into the surrounding lymph channels. Some of the lymph-spaces are filled with proliferated cells, varying in size from that of leucocyte to much larger having 1 to five nuclei, and resembling epithelial cells in places. They contain de-generated protoplasm, hyaline in nature. Here and there are areas of necrosis. It is an endothelioma arising from the lymph-channel. Complete hysterectomy. Recovery. Six months later multiple recurrence in chest, breast, loin, thigh. Death.

CASE 3. Reported by H. B. Deal, *Am. J. Obst.*, 895, xiv p. 300. Patient aged 45. II para. *Clinical history.* Menopause at 4. For over three years profuse atery discharge from uterus, blood-tinged for week slightly offensive. Uterus small free movable. Operation, September 3, 1904. *Macroscopic findings.* Uterus small. Small circumscribed tumor in right cornu. *Microscopic findings.* Angiosarcoma of the endotheliomatous type. Vaginal hysterectomy. Recovery.

CASE 4. Reported by J. C. W. Radmacher, *Inaugural Dissertation, Wuerzburg*, 895. Patient aged 43. *Clinical history.* Woman who died of mammary tumor. *Macroscopic findings.* On posterior lip of cervix a tumor the size of walnut. *Microscopic findings.* Section shows growth springs from the endothelium of the lymph-channels.

CASE 5. Reported by L. Dick, *Arch. f. Gynaek.*, 895, xlv. Patient aged 35. *Macroscopic findings.* Uterus shows submucous mass endometrium thickened below tumor. *Microscopic findings.* Section shows endothelioma originating in the lymph capillaries. Hysterectomy.

CASE 6. Reported by A. Dietz, *Arch. f. Gynaek.*, 896, lx. Patient aged 3. Null para. *Clinical history.* Periods irregular. Leucorrhoea for 12 months. Papillary tumor projecting from posterior cervical lip, endometrium long slightly bleeding, friable. Uterus not enlarged. *Macroscopic findings.* Uterus normal size. *Microscopic findings.* Section of tumor shows scant connective tissue stroma, the characteristic appearance of endothelioma—grouping of cells in central lumina. Blood vessel walls normal. Endothelioma lymphaticum. Vaginal hysterectomy. Patient died in three or four weeks. Cause not given.

CASE 7. Reported by Grape, *Inaugural Dissertation, Greifswald*, 897. Patient aged 54. *Clinical history.* Tumor projecting from vagina. *Macroscopic findings.* Metastatic growth from primary terine tumor. *Microscopic findings.* Section shows that tumor cells had invaded the musculature. Characteristic endotheliomatous formation. Vaginal hysterectomy.

CASE 8. Reported by E. Hudson, *Bull. J. Hosp.*, 1904, lxv p. 36. Patient over 50. *Clinical history.* Menopause ten years ago. For eight years severe pain in pelvis radiating to bladder. Slight hemorrhage three weeks ago. Tumor on both cervical lips. *Macroscopic findings.* Uterus not enlarged. *Microscopic findings.* Section shows the tumor springs from the endothelium of the lymph-spaces. Hysterectomy. Death fourteen days later from sepsis.

CASE 9. Reported by P. Kroeber, *Arch. f. Gynaek.*, 901, lxx p. 625. Patient aged 48. *Clinical history.* Had prediabetic bleeding. Hard, friable tumor on posterior lip of portio. Operation in 1900. *Macroscopic findings.* Uterus uniformly enlarged. Tumor involves the posterior cervix and extends through internal os into substance of corpus. The growth lies nearer the mucosa than the perosa. *Microscopic findings.* Mucosa of portio cervix and corpus intact. Characteristic endotheliomatous ar

arrangement of cells in groups in the small lymph-vessel. Abdominovaginal total extirpation. Death sixteenth day from peritonitis.

CASE 10. Reported by C. Gebhard. *Arch. f. Gynäk.* 1903, xlii, 1. Patient aged 42. Nullipara. *Clinical history.* For one year profuse bleeding. Tumor in left parametrium. Operation. 1903. *Macroscopic findings.* Tumor attached to the cervix. *Microscopic findings.* The tumor springs from the endothelium of the lymph-vessel—a typical endothelioma of the lymph-spaces. Hysterectomy.

CASE 11. Reported by H. Robb. *Am. J. M. Sc.* 1890, cxi, 14. Patient aged 65. *Para. 3.* Menopause 15 years. Three years later bloody vaginal discharge. To three weeks grinding pains in lower abdomen, pain in left leg, backache, constipation. *Examination.* Uterus antero-inclined, enlarged, not freely movable. Operation—curettage. *Macroscopic findings.* Scraping the tumor arranged in masses, sometimes solid at times, the central lumina. Cells of all sizes with large nuclei and look and more or less brown granules between the cells. Intercellular substance faintly granular, and some small lymphoid cells. The tumor cells ramify in the muscular tissue of the uterine wall. Cleft-like spaces in the rows of cells are filled with flattened endothelial cells. The cells fill the lymphatics, some of which are blocked, others showing central lumina. Tumor springs from the endothelium lining lymphatics in uterine wall. Endothelium of lymph-vessels atrophic. Uterine cavity retroverted, cervix uterine. Rec. Well one year later.

CASE 12. Reported by A. P. Horrocks. *A. M. J. Gynaec.* 1900, l, 5. Patient aged 34. VIII para. Abortions. *Clinical history.* For two years bloody flow, bleedings after coitus. Uterus enlarged. Tumor in posterior lip of cervix. *Macroscopic findings.* Uterus enlarged, in posterior position. Lip almost shaped like more size of plum. It is slightly raw, coarseness dense. *Microscopic findings.* Tumor section shows a cellular structure, lymph spaces of the villi in the endometrium enlarged and filled with tumor cells. Endothelium of lymph spaces. Vaginal hysterectomy. Recovery.

CASE 13. Reported by P. K. Koerner. *Ibid.* Patient aged 36. IV para. *Clinical history.* Marked cachexia, profuse hemorrhage. Uterus small, parametrium infiltrated. Ulcerated tumor in posterior lip of cervix. Operation. *Macroscopic findings.* Vaginal epithelium lacerated and that of cervix normally atrophic. Small cell infiltration, deeper substance of cervix beneath the epithelium. Characteristic endothelioma formation. Vaginal total extirpation.

CASE 14. Reported by P. N. Hansen. *Vierteljahr. f. Path. Anat.* et Berl. 1903, cxviii, 8. Patient aged 53. III para. *Clinical history.* Puberty at twenty, for two years growth of lower abdomen. Menstruation. Abdomen very large, adema. Operation. February 6, 1902. *Macroscopic findings.* Large tumor of uterus covered with serosa, anastomosing vessels lying in gelatinous mass. *Microscopic findings.* Tumor shows spots of cervix. Proliferation of endothelial cells in the lumina of the capillaries. Capillary endothelioma (hemangio-endothelioma) of uterus. Serosa antero-inclined. Death a few hours.

CASE 15. Reported by O. Silberberg. *Arch. f. Gynäk.* 1903, l, 4. Patient aged 65. Married. *Clinical history.* Somewhat profuse leucorrhoea, blood for two days. Curetted and cauterized. Refused operation. *Macroscopic findings.* Uterus enlarged, tumor in lower part of cervix. *Microscopic findings.* Scraping shows dirty gray color, characteristic endothelial structure

with colar meshes. Cellular proliferation in the lymph-vessel.

CASE 16. Reported by Rimmann. *Inaugural Dissertation.* Breslau, 1902. Patient aged 48. VI para. *Clinical history.* For three months profuse menstrual bleeding, every three weeks. On posterior lip of portio a tumor of the consistency of medulla. *Macroscopic findings.* Uterus enlarged, the tumor in the posterior wall. *Microscopic findings.* Section shows masses of small lymph cells from the endothelium mixed with spindle cells of the wall. Proliferation of the endothelium of the vessels. Abdominal total extirpation.

CASE 17. Reported by Rimmann. *Ibid.* Patient aged 36. *Para. 3.* *Clinical history.* For three months irregular bleeding. On portio small cauliflower-like growth easily bleeding, soft consistency. *Macroscopic findings.* Section shows diffuse colar endothelioma, prongs from lymph vessels. Vaginal total extirpation. Recovery.

CASE 18. Reported by O. von Franqué. *Zentralblatt f. Gynäk.* 1903, xli, 23. Patient aged 17. Married, nullipara. *Clinical history.* Puberty at 14. Menstruation irregular for past year. Last menses three months ago. Whitish leucorrhoea for six months. No pain, no bleeding. Cervix at tumor, bled and base cauterized. Ten days later operation. *Macroscopic findings.* Tumor projected from uterus, resembles placental tissue. It is on the portio and extends laterally into parametrium, especially on left side. Uterus 9.5 centimeters long, 4 wide and 3 deep. *Microscopic findings.* Section shows characteristic endothelial tumor. Tumor springs from endothelium of the lymph-channels. Total vaginal hysterectomy, removal of adnexa. Recovery.

CASE 19. Reported by P. pere. *Arch. Ital. di Gynec.* 1903, vii, VII para. *Macroscopic findings.* An inoperable terrene tumor found in a dead woman. Uterus centimeters long, cervix 3 centimeters long. Cervical mucosa healthy. A tumor in cervical tissue. *Microscopic findings.* Section of tumor shows an infiltration of connective tissue with large round cells, some cylindrical, some flat. Muscle tissue degenerated. Marked proliferation of endothelium of the lymph-vessels—a true lymphangiosarcoma.

CASE 20. Reported by P. Kirchgesner. *Zentralblatt f. Gynäk.* 1903, xlii, 97. Patient aged 34. III para. *Clinical history.* For 3½ years a yellow bloody discharge. A walnut-sized polyp in upper vagina springing from anterior cervical lip. Uterus not enlarged. *Macroscopic findings.* Uterus normal size. Tumor size of walnut in middle of anterior cervical lip. *Microscopic findings.* Section of tumor shows typical endothelioma, tumor formation, the growth springing from the walls of the lymph-capillaries—endothelioma lymphaticum. Total vaginal extirpation. Death in four days from septic peritonitis.

CASE 21. Reported by R. C. B. Maunsell. *Brit. Gynec. J. Lond.* 1905, xvi, 177. Patient aged 40. *Para. 3.* *Clinical history.* Prolonged menorrhagia. Progressive weakness, welling up of lower abdomen, mild purulent discharge from uterus. Cervix below umbilicus. Menstrual suppression from December 1902. Sinus opened in March 1903. In August 1903 bleeding from cervix. *Macroscopic findings.* Firm nodule situated in the lower part of the pelvis, 1.5 centimeters in diameter, 1.5 centimeters in length, 1.5 centimeters in width, 1.5 centimeters in depth. Median line dull, peritoneum not adherent. Cervix normal size. Tumor adherent to uterus with right body of uterus. *Microscopic findings.* Cervix ter, body of uterus, normal. Right half of uterus, no right corn, no tumorous with glabrous in 34 centimeters. Cervical circumference 35 centimeters. Transverse

circumference. Right tube springs from right side of tumor is normal in length. Right round ligament springs from tumor 5 centimeters below apparent origin of tube. Uterine cavity normal. Tumor enclosed in capsule of terine tissue lower portion an irregular firm myoma-like growth, upper portion cystic cavity lined with thin layer of same growth. *Microscopic findings.* Section of tumor shows a dense connective-tissue stroma containing alveoli of varying size, generally small. In these are masses of small cells with round nuclei and thin layer of protoplasm. The tumor resembles carcinomas, but the cells are smaller than cancer-cells. The cells in the alveoli are derived from the endothelium of the blood vessels. In some places connection can be traced between the normal endothelium of the vessels and the tumor-cells. The endothelial growth commences from the inner or endothelial lining of the blood-vessels. Endothelioma of terine fundus. Supravaginal hysterectomy; both adnexa removed. Recovery. No recurrence.

CASE 3. Reported by Cova, Arch. Ital. di ginec. 904, vii. Patient aged 35. Multipara. *Clinical history.* Fetal weeks bleeding. On the anterior cervical lip bloody mushroom-like growth, size of nut. *Microscopic findings.* Section of tumor shows alveolar spaces filled with leucocytes and cubical and polyhedral endothelial cells. These cells have also proliferated into the musculature of the terus. Vaginal hysterectomy. Recovery. No recurrence.

CASE 4. Reported by L. Federlin Beltr. J. Geburtsh. u. Gynaek., 904, viii, p. 9. Patient aged 3. Married sterile. *Clinical history.* Menstruation pausing off. Abdominal tumor reaching above the umbilicus. *Microscopic findings.* Uterus normal in size; its musculature thick, and in its walls three tumor nodules—to the right left, and in the posterior wall. Tumor of left ovary. *Microscopic findings.* Primary endothelioma of the ovary with metastasis in the posterior terine wall and in the right inguinal glands. Section of tumor shows alveolar structure with typical endotheliomatous formation. Total hysterectomy and removal of adnexa.

CASE 4. Reported by M. Graef. Arch. f. Gynaek. 904, xi, no. 72. Patient aged 50. *History.* Sanguinolent leucorrhoea with clots for some time. On portion vaginalis cauliflower-like canceroid the size of an apple. *Microscopic findings.* Section of tumor shows parallel and 1 piece radiating masses of cells, with large darkly-staining nuclei, of irregularly oval shape. The endothelium of the vessels is intact. Vaginal total extirpation. Death eight months later.

CASE 5. Reported by Marzucco. Arch. Ital. di ginec. 904, v. *Microscopic findings.* Section shows the tumor to be made of proliferating endothelioma.

CASE 56. Reported by H. Ravenius, Arch. de. med. exper. et d'anat. path., 905, xlvii, 3. Patient aged 44. *Clinical history.* Patient died from abdominal tumor which reached to the umbilicus. *Microscopic findings.* Tumor firm, of grayish-white color; lardaceous in appearance of fibrous consistency. Growth has invaded omentum, peritoneum, uterus, parametrium, and lymph-glands. In the prelumbar mesenteric, and inguinal regions it originated in the ovary. *Microscopic findings.* Section of tumor shows the characteristic endotheliomatous arrangement.

CASE 7. Reported by F. R. Zeit. J. Am. M. Ass. 906, xlv, 567. (Practice of D. Emil Klein.) Patient aged 68. *History.* Patient gave the clinical symptoms of uterine carcinoma. *Microscopic findings.* Uterus normal in size of hard, fibroid consistency 3 inches long 1½ inches broad. Uterine cavity obliterated. Entire cervix and all corpus uteri (except

the fundus) composed of hard tumor-like mass, of white, scirrhous appearance. Cut surface smooth white appearance with fine irregular and round monoleukic fields. The mucosa is smooth trophic glistening. *Microscopic findings.* Section of the tumor shows fibella ground substance with solid cellular cords cut in longitudinal and transverse sections. Lymph vessels and lymph spaces lined with proliferating epithelioid cell-masses. These cords of cells appear like cellular cylinders of large diameter (lymph vessel endothelioma) or as delicate cellular papillae of layers of flat cell branching here and there (lymph space endothelioma). The larger endothelial cell masses have numerous so-called lumina containing mucoid material. Other portions of the tumor look like scirrhous carcinoma. It is lymphangio-endothelioma intravascular of the terus. Vaginal hysterectomy. Death in 14 months from multiple metastatic tumors.

CASE 8. Reported by F. J. M. Werny and M. J. Gibson. J. of Path. & Bacteriol. 907, xii, 3. Patient aged 3. Married multipara. *Clinical history.* Well until 48 then irregular terine hemorrhages. Cervix enlarged, polyp removed. Hemorrhage shortly recurred. Uterus size of 6 months pregnancy very hard sensitive. Adnexa normal. Three months later cured. Large succulent masses removed. *Microscopic findings.* Uterus 4½ inches long 5 inches wide all uniformly thickened. Inner surface quite smooth. Embedded in wall of drum-shaped nodules size of hazelnuts, one each above upper and of cervix the other each from fundus, both softer than surrounding tissue lower one greenish that on section. *Microscopic findings.* Lower nodule consists of an intimate admixture of sarcoma (the cancer large spindle cells mixed with irregularly shaped cells giant-cells some with numerous nuclei. The carcinomatous portion consists of groups of large cells clear with large cellular nuclei cells round square, and cylindrical. The groups in many places show central lumina, either empty or choked with debris of polymuclear leucocytes. Some of the lumina surrounded with but single layer of cylindrical epithelium. Upper nodule composed of groups of large cells with or without lumina, they are embedded in dense fibromuscular stroma. The endothelial cells lining the lymph-cysts in the terine wall between the nodules are multiplied to produce rows of large cells markedly hyperchromatic. Some proliferation of endothelium of the small blood-vessels. Combined sarcoma and endothelioma of uterine wall. Hysterectomy.

CASE 30. Reported by M. H. Phillips, J. Obst. & Gynaek. Brit. Emp. 908, xiii, 3. Patient aged 50. Married nullipara widow fifteen years. *Clinical history.* For nine years increasing menorrhagia severe epigastric cramps for fourteen months intermenstrual hemorrhage. For several months offensive leucorrhoea. Back ache. Loss of flesh and strength. Profuse purulent leucorrhoea, containing necrotic material. Uterus size of four months' pregnancy but filled with firm, rounded tumor the size of golf-ball undergoing necrosis below. *Microscopic findings.* Uterus 3½ centimeters long 7½ inch and 7 anteroposteriorly anterior all greatly thickened by the new-growth, which almost obliterates upper part of terine cavity. Upper part of tumor gray color with reddish brown areas of hemorrhage friable deeply fissured presenting necrotic ragged surface to the uterine cavity. Lower portion ovoid in shape; yellowish-white of firm consistency. Fibrous smooth surface. *Microscopic findings.* Tumor largely composed of irregular masses of cells lying between the muscular and fibrous bundles. The cells are mainly polyhedral in shape but there are also numerous rounded and spindle-shaped cells. All have cell-defined nuclei, moderately rich in chromatin, and

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HÆMANGIOMA CAVERNOSUM

REPORT OF A CASE

By WILLIAM E LOWER MD FACS CLEVELAND OHIO

CLASSIFICATION AND ETIOLOGY

IF one may judge from the literature published under the general head of *hemangioma* there is considerable confusion concerning the real nature of this condition. In the reported cases for example there are several instances in which tumors classified as hemangiomata apparently were really either angiomas or nevi. Nicholls classifies as hemangiomata those tumors consisting of arteries capillaries and veins which are supported and held together by connective tissue or by tissues homologous with it such as adipose and mucoid tissue. In his differentiation of all hemangiomata into three groups simple arteriole and cavernosum he includes in the latter class those in which there are large vascular spaces or sinuses lined with endothelium. With its reticular blood spaces the hemangioma cavernosum is similar in structure to the corpus cavernosum of the penis. The irregular spaces are filled with blood they communicate with each other and they are sur-

rounded with a retiform fibrous tissue which also contains elastic fibers the network varying in thickness in different parts of the tumor. The mass is fed by a single artery and discharges its blood into the dilated veins.

A hemangioma cavernosum is evidently the result of some anomaly in development the exact nature of which is unknown. Nicholls finds this growth in situations corresponding to the embryonic lines of fusion such as the facial or branchial clefts. Karsinsson defines the usual positions of hemangioma cavernosum as the anterior and lateral parts of the neck where it often extends along the whole of the neck from jaw to clavicle.



Fig. Case of hemangioma cavernosum baby four months old showing size and location of the tumor.



Fig. Case of hemangioma cavernosum baby four months old showing size and location of the tumor.



Fig. 3. Case of hæmangioma cavernosum, showing result after excision, also the line of incision.

or it may be limited to one part as to the submaxillary or the supraclavicular fossa. It may extend from the very front to the back of the neck, or from the base of the skull to the clavicle. In fact, cases are recorded in which the tumor has passed under the clavicle and has extended into the axilla, and others in which it has invaded the mediastinum after passing behind the sternum. Whatever its situation this growth has a tendency to ad here closely to the sheath of the great vessels especially to the jugular vein.

In Lexter Bevan it is stated that human goma cavernosum is partly expansive and partly infiltrating in character; it may be slow and continuous in growth or it may increase rapidly after a stationary period. Not infrequently an encapsulated hæman gloma is found which has ceased to grow. In most cases, however, the mass gradually infiltrates the neighboring tissues including both the cellular spaces and the muscles themselves. After thrombosis and cicatricial contraction of parts of the tumor the involu tion may be complete.

DIAGNOSIS

The peculiar color and form of this variety of hæmangioma practically assures the diag

nosis. Another distinguishing characteristic is the fact that the cyst may be decreased by pressure immediately assuming its original size and form when the pressure is removed. The tumor is bluish in color and increases in size when the patient coughs or cries. It is encapsulated and palpable and since it is fed by a large artery it pulsates. Morris thinks all cavernous hæmangiomata are pre sent at birth though they often are not noticed immediately.

TREATMENT

The usual treatment of a hæmangioma cavernosum is its complete extirpation al though Carl Beck has devised an ingenious method by which the masses of vessels are gradually transformed into connective tissue by a subcutaneous spiral ligature. In this manner the circulation is shut off within the tumor. This procedure is repeated until the tumor has been diminished to the smallest possible nodule of connective tissue and the healthy skin enlarged to the utmost. Then the hard connective masses are excised and the borders united in fine linear union. It is necessary to ligate the largest afferent vessels.

CLINICAL HISTORY OF CASE

The appearance and treatment of a typical case of hæmangioma cavernosum is well illustrated by the following history of a case of my own.

The patient, baby of four mo. this, was referred to me by Dr. Schmoldt and on January 2, 1906, was sent to Lakeside Hospital. The father was living and well; the patient being the only child of a second marriage. The mother had history of kidney trouble and pain in the back, but no dyspnea or swelling of the feet. The family history was negative for malignancy or heart disease.

The patient, full-term baby, was bottle fed, and had never been sick. Soon after birth the mother noticed a small lump about the size of a walnut just above the clavicle on the right side of the neck. This mass was quite soft and was the color of the surrounding tissue. Palpation was not painful. The tumor gradually increased in size until the child was three months of age when it began to assume a bluish tinge. Whenever the baby cried the mass appeared to increase in size but there was no accompanying pain. At the time the case first came under my observation, the mass had reached the size of a



Fig. 4. Case 1. Hemangioma cavernosum showing the shape of mass after excision.

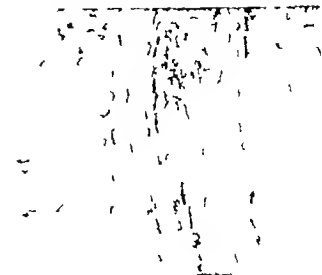


Fig. 5. Case 1. Hemangioma cavernosum showing section through wall.

large lesion and occupied an area on the right side of the neck extending from beneath the scapula and clavicle almost up to the ear (Fig. 4). It was bluish in color and increased in size when the baby cried or was held up by its feet. On palpation it was found to be soft and seemed multilocular in character. Light did not penetrate the mass. On continued gentle pressure it decreased slightly in size and some pain was caused. The skin was freely movable over the tumor which was somewhat adherent to the underlying tissue, no definite pedicle being discerned. The roentgenogram showed a very definite outline of the tumor (Fig. 3).

Under nitrous oxid and oxygen anesthesia an incision was made around the base of the tumor with the idea that if complete removal became too hazardous it might still be possible to ligate or compress the vessels supplying it. By sharp dissection I was able to cut around the growth and finally to remove it intact. The cyst was in close proximity to the large vessels of the neck, extended behind and below the clavicle was in direct contact with the pleura its tip being behind the scapula. The blood supply apparently came from a branch of the subclavian artery. Hemostasis was secured by fine silk ligatures and the wound was closed with continuous sutures of No. 10 silk. The dressing were put on very loose so as not to interfere by pressure with the circulation in the flap. There was an immediate sharp rise in temperature but the patient made a complete and rapid recovery.

The pathological examination confirmed our diagnosis of hemangioma cavernosum. The tumor weighed 15 grams and measured six by five centimeters (Fig. 4). It was coarsely lobulated, reddish purple in color and fluctuant. The surface was covered by numerous small fat tabs. The mass was soft cystic thin walled and was apparently divided into numerous small and large communicating cavities. The contents of the mass consisted of co-

agulated clots of thin brownish chocolate colored fluid and some old broken down blood-clot. The inner lining was smooth glistening and membranous. In some of the smaller spaces there were present organizing blood clots adherent to the wall. The smaller and larger spaces were often connected by fine cord like structures resembling chorda tendinae. No very large or definite blood vessels were found entering or emerging from any of the spaces.

A macroscopic examination of a section through the wall (Fig. 5) showed a fibrous tissue framework in which were numerous fairly large thin walled endothelial lined spaces filled with blood. Many of the vessels had well-defined coats while others were simple spaces lined with endothelium. There was considerable lymphocytic and eosinophilic infiltration chiefly around these blood vessels. There was also considerable coarse brownish pigment scattered about chiefly intracellular. The walls of the large spaces consisted of a thick fibrous inner coat lined by endothelium in places and of an outer muscular coat. The histological appearance was that of greatly distended veins having well defined fibrous and muscular coats. The lesion was comparable with cystic hygroma the blood vessels instead of the lymphatic system being involved in this case. The diagnosis of the pathologist was congenital blood cyst or cavernous hemangioma.

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AN OPERATION FOR THE RELIEF OF EPISPADIAS IN THE MALE¹

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IN view of the well known difficulties encountered in dealing with epispadias in the male I wish to describe an operation for its relief which we have found to be simple and efficient.

There are certain definite indications for operation (1) to relieve urinary incontinence (2) to change the point of exit and the direction of the urinary stream and of the semen (3) to change the direction and length of the penis (4) to restore the penis to a more normal appearance.

As a result of the more or less complete urinary incontinence and of the point of exit of the urine at the base of the penis the skin of the suprapubic region is constantly macerated, inflamed and at times ulcerated. The position of the penis in relation to the abdominal wall is such that the stream of urine is directed almost vertically upward acting as a sort of spray against the pubes.

Furthermore the direction and small size of the penis make coitus difficult or impossible, while the point of exit of the semen at the penopubic junction makes impregnation

highly improbable. The restoration of the penis to as nearly normal a direction as possible is, therefore, much to be desired while an improvement in the appearance of the organ does much to eliminate that sense of shame and sensitiveness which so often harasses the victim of a malformation of the genitals.

Although a simple plastic operation such as is here described, cannot be expected to do away with urinary incontinence entirely, marked improvement often takes place, a feature already noted by Stettiner in an extensive survey of the literature. In babies and young children even when normal, there is little or no volition in the control of the vesical sphincter. But as the child grows older control is gradually gained and can often be developed to a remarkable degree by a system of muscle training aimed directly at the sphincter. I have used this successfully for a number of years in the case of the bladder in tabetics but it must be

Epispadias & Chel. Orth.
Boston M. & S. J. 10 Dec. 1914

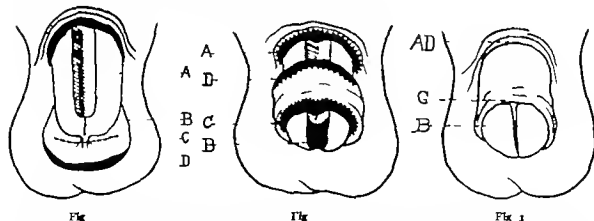


Fig. 1. Diagram of penis. A Refreshed edge of pubic skin fold, B line of incision through glans to prolong urethral gutter to its end, C button-hole incision through prepuce, D refreshed edge of prepuce for suture to A.

Fig. 2. Diagram of plastic operation. A as in Fig. 1 ready to be sutured to D Fig. 1. The inner or mucous layers (straight edges) are approximated one to the other after which the outer layers (serrated edges) are united.

The outer (serrated edge) layer of the button-hole incision C Fig. 1 is then sutured to the inner or mucous layer (straight edge) B is the newly-formed portion of the urethra.

Fig. 3. Diagram of penis after operation, showing lines of suture at A, D and C. The entire urethra is now roofed over except the short portion formed by B at which point the urine now makes its escape.



Fig. 1. Epispadias before operation. Penis drawn down. The almost circular defect in the prepuce is clearly seen. The small columnar prepuce.

Fig. 2. Epispadias before operation. Penis drawn down. The urethral gutter is visible. The small prepuce is also shown.

remembered that in epispadias one is dealing with an imperfectly developed phancter muscle.

None the less such training is to be regarded as a highly essential post-operative measure and if the patient is old enough and intelligent enough to cooperate there is every prospect of success. It is also important that the patient should be kept under fairly regular observation. The vesical phancter must be not only brought to but maintained at the highest possible point of efficiency and this can be accomplished only by constant attention.

The technique of the operation is as follows:—
1. The urethral gutter already formed is carried out to the very end of the glands by dividing the structure longitudinally and to the proper depth as shown by the dotted line *B* in Fig. 1. In order to prevent its edges from again uniting the groove is kept constantly lined with gauze or better with rubber tissue until the mucosa has covered the raw surfaces.

The prepuce always voluminous (seen in profile in Fig. 4) is used to form a roof over the urethral gutter. To this end a transverse button hole incision (C Fig. 1) is made through it just below the frenum and extending laterally nearly to its edges. At the same time the lower edge of the prepuce is denuded by the removal of the narrow strip of skin *D* (Fig. 1) and a similar procedure is carried out on the fold of pubic skin which roots the urethra at the root of the penis (1 Fig. 1).

The plans is then drawn through the button hole, lit in the prepuce so that the denuded lower edge of the latter now comes well up on the penile shaft (*D* Fig. 1). It will also result that the glans is completely surrounded by the edges of the button hole incision (C Fig. 2). The newly formed portion of the urethra is indicated at *B* (Fig. 2).

4. The plastic is now completed by suture of the cut edges—4 (Fig. 1) approximated to *D* (Fig. 2) the inner layers (represented by a straight line) being united one to the other with No. 00 chromic catgut, the outer layer (represented by serrated edges) being united in the same manner but with fine silk or Pagenstecher linen. The unusual redundancy of the prepuce allows this union to be made without tension. The edges of the button hole (C Fig. 2) are then sutured to one another (straight edge to serrated edge in the diagram) with silk or Pagenstecher linen.

The completed sutures have the appearance and position indicated in the diagram (Fig. 3, 4*D* and *C*) while the new portion of the urethra, the new meatus is seen at *B*. The rest of the urethra is completely roofed by the plastic flap which can be readily retracted like a normal prepuce.

The more or less vertical position assumed by the penis in epispadias is to be attributed to its unusually short suspensory ligament. While in my experience the plastic operation already described has been sufficient to restore



Fig. 6 Roentgenogram of the symphysis showing separation of the pubic bones.

the penis to an essentially normal position other writers (Duplay Stettiner) have spoken of the desirability of cross-cutting the suspensory ligament and suturing it longitudinally to accomplish this purpose.

While the entire operation can be done at one sitting it has seemed desirable to do Part I as a preliminary step allowing two or three weeks to elapse before performing the more extensive plastic operation. This will allow the newly formed portion of the urethra to become thoroughly covered with mucosa. Furthermore every chance should be given the wounds to heal *per primam*. The bladder should therefore be constantly drained by an inlying catheter of the self-retaining type or in the opinion of some surgeons, by a catheter brought out through a small perineal incision. The latter method however has the objection that in order to do this the corpora cavernosa, which in epispadias, underlie the corpus spongiosum and the urethra must be separated or incised in their perineal portion, a procedure which is not easy to accomplish and which may be accompanied by considerable bleeding.

Yet in spite of every care it seems to be the general experience as it has been mine, that the plastic flaps will fail to unite at one or more points. These fistulae are a source of annoyance, but can be easily closed by suture at a subsequent time.

In adults the entire operation can be done with novocaine anesthesia. In infants and young children full ether anesthesia must be given.

The following case illustrates well the essential points of epispadias and of the operation described.



Fig. 5 Appearance of the penis three years after operation. The prepuce is small and completely retracted and the direction of the penis is normal.

A 7 year 10 month old boy (February 4, 1913). Family history no other congenital defect. Past history unimportant. Present illness: Malformation of penis with urinary incontinence since birth. The patient wet the bed almost every night and his clothes are wet all day. Sometimes he is aware that urine is escaping but usually is not. At times he goes for two hours without urinating. During erection the penis is held loose to the abdominal wall. It has never itched or itched.

Physical examination: Healthy looking intelligent boy with no demonstrable abnormalities congenital or acquired except of the penis. Both testes normal size on examination and sensation, and are fully descended. There is a typical and complete epispadias, but the malformation cannot be fully appreciated till the penis is drawn down by the prepuce (Fig. 5). The nearly vertical position assumed by the penis at small size and its voluminous and prolike prepuce has already been shown in Fig. 4. A roentgenogram of the symphysis (Fig. 6) shows very considerable separation of the pubic bones (a constant feature of all such cases). The pubic skin is red thickened and covered with pustules (Fig. 5). The stream of urine forms a sort of spray

against the pubes but when the penis is pulled downward the stream can be fairly well directed into a basin. When the boy coughs or makes any muscular effort which fixes the diaphragm urine is seen to gush from the urethra. Urine normal. Training of the vesical sphincter started and continued daily with good response.

February 21. Can hold urine for four hours. Confinement of pubic skin is greatly improved since it has been kept dry. Under ether the urethral gutter was extended to the end of the glans by a longitudinal incision (B Figs. 1 and 2). The edges of the wound were separated by a strip of rubber tissue. Self retaining catheter to bladder was kept in place for 5 days. March 2. Training of sphincter has been continued. The patient can now hold urine in the day several hours and often passes nearly a pint at a time. He keeps dry all night by being aroused once or twice to urinate. March 3. Under ether a plastic was done on the prepuce (Figs. 1, 2 and 3) and a self retaining catheter inserted. There was good union of the skin edges except for a small area at junction of 4 and 5 through which urine leaks. March 13. Discharged but is to return for closure of the fistula.

October 6, 1913. Re-entry. There is no frequency of urination. He has good control day and night. The penis hangs in a nearly normal direction. The urethra now runs to the end of the glans and the newly formed part is lined with mucosa. The pubic skin is healthy. October 21. —

Under ether the small fistula in plastic was closed by suture. Self retaining catheter inserted. October 30. Discharged. To return for observation.

August 1914 seen in Out Patient Department. His condition is greatly improved. The preputial flap now covers the entire urethra except at its distal extremity. There are no fistulae. A stream of urine issues from the end of the penis so that the patient can stand at a urinal without wetting his clothes. He says he does not leak at night and can retain urine for several hours. Urine normal.

November 1914 the patient writes that he has no trouble with urination.

January 1, 1916. Patient was seen at hospital. His general condition is good. Urinates 5 or 6 times a day, gets up sometimes once at night. There is considerable incontinence by day but never wet bed at night. He passes a good stream and directs it well. Sex function evidently normal but has no emissions and has not attempted coitus. Plastic looks well and prepuce covers nearly whole of glans. Rectal examination shows prostate small but normal in contour. Vesicles not felt.

The patient has had no training in the control of the sphincter since he left the hospital. From my experience in this case and in others I do not hesitate to say that if exercises for the education of the sphincter could be undertaken with fair regularity and frequency the diurnal incontinence of which the patient now complains could be greatly improved or even entirely done away with.

ECTOPIA TESTIS TRANSVERSA WITH INFANTILE UTERUS

By ARTHUR E. HERTZLER, M.D., KANSAS CITY, MISSOURI

THE condition in which both testes find their way into one scrotal pouch was designated by von Lenhossak as *ectopia testis transversa*. But one testis of course is ectopic. The other one under goes a normal descent and is accompanied by its fellow which instead of descending into its own side crosses over to the opposite side and accompanies or follows its normal fellow.

The cause of this transposition is found in some early developmental disturbance. The nature and cause of this disturbance furnishes the most interesting problem in this lesion. Though rare some 13 cases having been described enough data is available not only to make possible some conclusions relative to

the clinical treatment of this condition but presents data of importance in the whole problem of developmental anomalies of the genito-urinary system.

The specimen which I have to report made its appearance in the literature in 1907. Dr. Halstead at that time operated on the patient for hernia and noted the testicular transposition. He reported it and presented some comments on the origin of this condition. His report is as follows:

D. C. B. American single age 42 entered the Cook County Hospital in January 1904.

History. Patient has had a left inguinal hernia of large size since early childhood. Of late this hernia has increased in size until now the tumor measures eight inches from the pubic p. n. to



Fig. Below are the testes showing the coverings detached to the right. Above the testes is the infantile uterus on either side of which are the epididymides.

the lower limit of the scrotum. Two months ago the hernia which had previously been reducible became irreducible and painful. In addition to the hernia he has for several years been suffering from severe hemorrhoidal disease. His object in entering the hospital was to secure by operative treatment relief from both diseases.

Exam. athen. On entrance, examination showed a well developed middle aged man. Nothing worthy of note was found except large left inguinal hernia distending the scrotum to the size of child's head. Rectal examination disclosed the presence of large mass of fecal material protruding from the anus.

Operation. In clinic January 7, 1904, assisted by Dr. R. H. Renhouse surgeon. After the usual preparation, an incision 3½ in. in length was made over the hernia exposing the sac. The sac was opened and the adherent loops of small intestine constituting the content of the hernial sac were after being freed returned to the abdominal cavity. In separating the sac it was noted that the spermatic cord was of unusual size. While freeing the sac from the cord the remaining contents of the left side of the scrotum were brought into the incision. This was found to be the structure which in superficial examination closely resembled a uterus with

the tubes and ovaries attached. Upon closer inspection it was found that the central body representing the uterus, consisted of a fusion of the epididymides of the two testicles. The testicles were not closely adherent to the heads of the fused epididymides, but swung free from the attached lower half of each with the entire mass dislocated forward into the operative wound. The fused heads of the epididymides occupied position behind and somewhat below the testicles. The testicles were enclosed in common tunica vaginalis. The vasa deferentia could be traced separately from the globus minor upward behind the fused epididymides to a short distance above the globus major where they approached each other and apparently became fused into one cord close to the internal ring. There were two spermatic arteries and two sets of veins (these were of large size and, with the large vasa deferentia, of unusual amount of fatty tissue greatly increased the size of the cord). The testicles were small and in size were decidedly out of proportion to the large mass representing the fused epididymides.

Examination showed the right side of the scrotum to be empty. The right internal ring was closed.

This patient reentered medical records by consulting Dr. A. E. Spalding of Luverne, Minnesota, November 1, 1913. The following is abstracted from Dr. Spalding's report:

At that time the patient presented enlarged scrotum containing several ounces of fluid which was removed by needle. He again presented himself for examination October 6, 1904. At this time the scrotum was as large as two fists and was causing much pain. On October 29, 1904, the scrotum was removed. The mass was exposed through a long inguino-scrotal incision, the cord isolated and tied. This being done, second cord, larger than the first, was exposed. This part of the cord cut like cartilage and showed a dense-walled tubelike structure between the two testicles. When the mass was severed, coffee-colored fluid escaped.

The specimen was sent to Dr. L. W. Littig of Davenport, Iowa. It was through the kindness of Dr. Littig that I was enabled to study the specimen.

The specimen presented a bilobed mass surrounded by thick capsule and tubercles above in a long pedunculated process. The lower portion of the mass is made up of two lobules which are testicular in form, slightly smaller than normal testicle and when arranged parallel with each other and with the central axis of the mass they are easily recognized as testicles. Situated posterior to these bodies are corrugated tubules enclosed in a fibrous sheath, free below but united above. These are readily recognized as epididymides after the fibrous tissue

is dissected off. Leading from the upper poles of these are wound cords, obviously vasa deferentia. These pass upward over an elongated pyriform mass. This mass is unattached to either epididymis or testis.

This body forms the most interesting feature of the specimen. It begins just above the upper poles of the testes as an elongated pyriform body 2 centimeters in its transverse diameter and 1 centimeter in its anteroposterior diameter. It gradually narrows to 6 millimeters at its termination where it is tubular (Fig. 1). Its termination shows that it was severed during the operation and that the entire specimen was not obtained. When opened in a longitudinal direction it shows a triangular lumen 1 centimeter wide below gradually narrowing above. The anteroposterior diameter is only a millimeter or two. The cavity is lined by a smooth mucous membrane. The cut surface of the wall of this mass is a uniformly deep red in color.

The walls of this body are formed of non striated muscle fibers. The lining is a mucous membrane made up of a low columnar epithelium with simple tubular glands lined with cuboidal or low columnar cells. In short the structure is that of an elongated infantile uterus.

The testicles and appendages present an entirely normal structure.

The interest in this specimen lies less in the transposition of the testis rare as this condition is than in the presence of the small uterus a condition noted in the literature in but one other instance. Case 7, reported below.

Various theories of the origin of this condition have been advanced and these are presented in conjunction with the case reports.

The following brief abstracts represent all the cases that I have been able to collect from the literature. In some of the cases reported a careful dissection of the parts was not made and therefore a detailed description of the condition could not be given.

CASE 1 Reported by v. Lenhossak.¹ This specimen was removed at autopsy by the author's father in 1845. The patient was a man of 35. Both testicles were of normal size and contour and both lay in the bottom of the scrotum on the left side the right however being 2.5 centimeters higher than the left. The vasa were differentiated a few centimeters from their origin but approached each other and became so closely bound together by connective tissue that one might have thought that they were one. Thus bound together they passed through the inguinal canal to the abdomen and at the upper end of the prostate they again became divided, the left entering a normal seminal vesicle on the left

side the right going by a sharp angle to the right to enter a normal seminal vesicle on the right side.

The author suggests that this condition was probably due to either a faulty development of the right testicle on the left side or to the action of certain forces which carried it to the opposite side. In favor of the view that the testicle developed on the wrong side are the various examples of a similar condition in the kidney. A double kidney with two ureters has been reported by Stocquart.² This is an example of the transposition of an antimeric

CASE 2 Reported by Jordan

Patient age 8 had hypospadias in the third degree. The right side of the scrotum was small being marked only by a small prominence. The left side was about the size of a goose egg. Upon opening the processus vaginalis at operation two testicle like bodies were noted in the scrotum from which two cords extended to the rings. Three months later the hernia recurred and a new hernia operation was performed the total contents of the scrotum being removed. There was a single vas for both testicles which was large and out of proportion to the age of the patient. The thickness of its walls increased from above downward and below it ended in an ampulla which was broad, particularly in its transverse diameter. The vasa arose from the corners of this and the epididymus was much enlarged and fibrous. The right vas was normal in size and led to the bursa inguinalis to a lobule of fat. This vas had no epididymis but some epididymal canals were present instead of the epididymus. No testicle was present on this side.

The cause of this condition is to be found in an early fusion of the wolffian ducts in that part lying nearest to the sinus urogenitalis while that portion lying nearest to the testicle remained free. They fused abnormally in the same manner that the muellian ducts normally do. The thought must be entertained, however that well-developed muellian ducts may have played a rôle. These changes certainly take place before the descensus (Examined by Kjaatsch.)

CASE 3 Reported by Linser

Patient a boy age 2 1/2 years. Both testicles lay in a serous cyst in a right-sided inguinal hernia. The testicles lay side by side were of equal size and the epididymides were well formed. The vasa were separated and I found to extend to the base of the bladder but they could not be traced with certainty to the seminal vesicles.

The author believes that there was a double anlage on the right side and that the left had either atrophied or an anlage had never formed.

CASE 4 Reported by Christopherson

Patient age 22 came to the hospital with a swelling in the right inguinal region, extending from the external abdominal ring into the scrotum.

¹Archiv. Arch. f. path. Anat., etc., Berl., 579, 1877, p. 44.

²Deutsch. med. Wochenschr., 1893, xix, 5, 5.

Berlin. Klin. Woch., 1900, xxix, 15.

Brit. M. J., 1900, 4, 3, 2.

Upon opening the right inguinal canal a jelly-like mass was found extending through the canal and into the scrotum. This mass was about the thickness of three fingers and unencapsulated. There were two spermatic cords coming through this same canal, one of which, traced downwards, ended in the epididymis of the descended and very much enlarged testicle. The other cord ended in frayed out ends which were lost in the embryonic jelly-like tissue at the top of the scrotum. This cord lay to the inner side and behind the other cord, both cords felt and looked natural and were easily separable from each other. There was no cavity in the left side of the scrotum nor was there any sign of a descended processus vaginalis.

The author thinks that the fully developed and descended testicle was the left because the prostate was well developed on the left side but seemed absent on the right.

CASE 5. Reported by Berg.

Patient, age 13 had had a left sided rupture since birth. The right side of the scrotum was poorly developed and there was a large scrotal hernia on the left side. At the bottom of the left half of the scrotum was a fair-sized testicle, its free concave border pointing downward. From its right pole a normal-sized cord passed upward to near the root of the penis, then curved sharply to the left and was lost near the opening of the hernial ring. When the patient coughed slightly a smaller testicle could be felt at the left external ring which could be pulled down into the scrotum. A cord passed from it into the hernial ring. The right external ring was very small and no cord could be felt to enter it. At operation both testicles and cords were found to be intimately connected with the hernial sac on the left side. Both cords passed through the left inguinal canal. The upper testicle was the smaller and its cord had a distinct mesentery. This cord passed up into the left inguinal canal, through the internal ring, across the space of Retzius to the right inguinal region where it descended to the pelvis. The larger testicle lay in the bottom of the sac its cord passed up into the left inguinal canal and descended on the left side of the bladder to the pelvis. The right internal ring was exposed and found to be closed. The scrotum showed no evidence of division into two compartments. Both cords and testicles were treated as one and the radical hernia operation completed in the usual manner.

CASE 6 Reported by Romanowski and Winter.

Patient, age 61 died of pneumonia. On section there was noted a fold which extended from the foramen inguinale laterale across the anterior wall of the pelvis, behind the upper surface of the bladder, to the left of the foramen inguinale laterale where it disappeared. The plica differentialis was absent on the right side but was well developed on the left.

The right side of the scrotum was empty. The external ring on this side was very small and out of it came a small connective tissue band which ended like a ligamentum teres. On the left side the external ring was much enlarged and the cord thickened. Upon opening the sac two testicles were noted the right situated slightly above the left which was small and deformed. The right was larger and less deformed but had the epididymis on its summit, from the center of which the vas arose. The processus vaginalis was open to near the external ring but from this point on it was completely obliterated. The left was run in its normal course to the base of the bladder and into the seminal vesicle. The right was however traced the bladder obliquely over to the right side its course corresponding to the plica differentialis already noted. The right spermatic vessels arose at the normal place and described a normal course to the linea terminalis, from which point they followed the previously described peritoneal fold from right to left to the left ring. A gubernaculum Hunteri could be traced from the external ring through the canal and across the summit of the bladder in company with the vessels.

The author thinks that there must have been some normal connection between the two testicles which made it possible for the left to take the right with it in its descent.

CASE 7 Reported by Cornil and Brouard.

Patient, age 9, had a uterus in the tunica vaginalis which was united with two testicles. This uterus measured 9.3 centimeters in length, the body being larger than the cervix and the walls somewhat thickened. On one side the tube emerged normally but became adherent to its extremity to the testicle. On the other side the cornu of the uterus was united to the testicle by a fibrous mass. On section of the uterus the walls were found to be thick, the mucosa congested and presented transverse plications separated by ridges millimeters in diameter.

Histological examination. (1) Uterus. On section it was found that the transverse plications represented numerous glands and tubes lined by a tall epithelium. Between the depressions there was thicker rich in small cells and contained fewer glands. Toward the body cavity the mucosa was more papillary. These papules were formed by inflammatory tissue with hypertrophied glands lined with tall epithelium. (2) Testicles. Sections made at the point where the tube attached showed a normal tube and epididymis united by connective tissue. The testicles were normal and spermatogenesis very active. The fibrous band going out from the opposite cornu showed likewise tube and epididymis united by fibrous tissue. There was not the vestige of an ovary. Section of a cornu showed a tube in its interstitial tissue.

This condition was due to a diversion in development consisting of an increased development of the uterus due to the fusion of the müllerian ducts.

The wolffian and muellerian ducts must have developed side by side because they were united by a common connective-tissue envelope.

CASE 8. Reported by de Castelli

Patient age 23 came into the hospital to be operated on for a right sided hernia. The hernia was congenital and had gradually increased in size and become very painful. The left side of the scrotum was found to be empty. The right side contained two testicle like bodies, which were painful on pressure. From these came two cords which disappeared into the inguinal ring. At operation the cord was exposed accompanied by the artery and veins. Within the canal was a testicle and from this ran a fibromuscular cord connecting it with a second testicle in the scrotum.

CASE 9. Reported by Bottaro³

Patient age 13 had no history in his family of hernia or testicular anomalies. An oblong body about the size of a walnut was noted in the right inguinal region. This was somewhat sensitive and was reducible but a part of the mass remained in the inguinal canal. The left inguinal canal was found to be free and a diagnosis of abdominal retention of the left testicle was made. At operation two cords and two vaginal processes were noted extending down the inguinal canal one going to a testicle in the scrotum the other to one in the inguinal canal.

CASE 10. Reported by Lowe

Patient age 3 was brought to the hospital to be operated on for a left inguinoscrotal hernia. The hernia appeared to be congenital but no reliable history was obtainable. When the structures in the canal were being isolated from the sac two cords were discovered and these were traced to two testicles lying in the scrotum. They were each the size of a normal single testicle. After the sac was ligatured the testicles were returned to the scrotum. After this reduction the scrotum appeared highly

unsymmetrical the left side being very full and the right quite empty.

CASE 11. Reported by Marsh⁴

Patient age 3 was operated on for a large congenital hernia of the left side. Upon exposure of the ring two cords were found passing down to two testicles which were enclosed in one tunica vaginalis. The child died of cholera some 36 hours later and at autopsy a careful dissection of the part was made. There was only one vesicula seminalis situated on the left side and it was considerably larger than normal. In connection with it was a very large vas as thick as an ordinary drawing pencil which took the normal course as far as half an inch from the internal ring where it divided into two of equal size which passed down the inguinal canal into the scrotum to the two testes. The right spermatic artery crossed over the middle line about three inches below the umbilicus and meeting its fellow of the opposite just inside the internal ring joined with it to form a single trunk. This trunk divided again before reaching the external ring the two vessels being distributed to the testes in the ordinary manner.

CASE 12. Van der Horn van den Bos⁵ presented a case in which incidentally in the course of a hernia operation he found that both testicles had passed through the right inguinal canal into the right side of the scrotum.

CASE 13. Reported by Widhalm⁶

Patient age 4 was married and had three children. The right testicle was somewhat atrophic. He had had a hernia on the left side since childhood. The sac was filled with omentum and there was marked cyst formation. There was a hydrocele about the size of a fist on the cord and lower down a smaller cyst which contained two testicles of equal size. Behind they were united by a band form epididymis and off from this came two independent vasa.

Brit M J 9 4 154.

Ref Zentralbl f Chir 91 xxxviii, 113.

⁶Wien med Wochenschr 9 161, 1498.

Refurma med 009, xiv 33 ref Jahrbuch d. Fortschr d
Chir 009 00
Pobclnaco p xiv 130.
Brit M J 9 513.

PRIMARY CHORIO-EPITHELIOMA OF FALLOPIAN TUBE FOLLOWING RUPTURED ECTOPIC GESTATION

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P RIMARY chorio-epithelioma of the fallopian tube is of comparatively frequent occurrence when we take into consideration that tubal gestation forms but a small proportion of all uterine pregnancies. Of approximately 300 cases of chorio-epithelioma that occurred up to 1905 the primary tubal variety comprised about 3.5 per cent of the total number.

In 1905 Risel (1) made an exhaustive study of primary chorio-epithelioma of the tube and collected 11 cases in the literature which he reviewed in great detail. He reports an interesting case of a woman 35 years of age in whom apparently a chorio-epithelioma followed a tubal abortion.

The woman had had three normal labors, the youngest child was five years of age. For about four months after the onset of vaginal bleeding a bloody tumor measuring sixty centimeters, of left tubo-ovarian region was removed. Six weeks after operation symptoms of intestinal obstruction developed and one month following the onset of symptoms, operation disclosed an inoperable bloody tumor in the pelvis between the uterus and rectum. Shortly after operation, the woman died, seven months elapsing between the advent of symptoms and fatal termination. Post-mortem examination showed the genitalia and uterus free from the growth but numerous metastases were found in the liver and both lungs.

In addition to the above 11 cases recorded by Risel, Leipmann (2) adds 7 more making a total of 18 cases of primary chorio-epithelioma of the tube up to the year 1914. In Rosner's (3) case reported in 1912 the tumor attained the size of a man's head. In one of the two cases reported by Davidsohn the tumor developed in the stump of the tube which had been removed for a ruptured ectopic gestation. Lefquist's case is also quite interesting.

In 1906 the patient was operated upon for tubal pregnancy. The tube was cleared of all gestation products but was not excised. Two years later a pregnancy in the same tube recurred, and at opera-

tion the tube was removed. Pathological examination revealed an early development of a primary chorio-epithelioma of the tube.

In the majority of the cases reported recurrence was the rule the patient succumbing to the disease but in a comparatively short time after onset of symptoms.

The case that I am reporting was operated upon in St. Joseph's Hospital by Dr. P. B. Bland and was referred to him by Dr. Koplin of Trenton New Jersey. The following history was obtained.

A S. 34 years of age, white, married. She began to menstruate at 13 years, was regular and normal. The patient was married for twenty years had six normal pregnancies and four abortions. The last pregnancy terminated in abortion four months prior to the onset of symptoms. Five weeks before the patient complained of vaginal bleeding accompanied by severe cramp-like pains in the lower abdomen. A diagnosis of ectopic gestation was made and operation devised. The operation was performed in December 9, 1914. The abdomen was opened. The right tube showed pregnancy with rupture. The uterus was enlarged and soft and was the size of pregnancy of about six weeks. The tube and ovary were removed and the abdomen was closed. The pathological report of the specimen is as follows.

The mass consists of tube and ovary and gestation sac in collapsed condition. The tube measures 5 centimeters in length and 4 centimeters in diameter at its widest portion which is situated near the fimbriated end. The lumen is filled with clotted blood and the walls of the tube are considerably thickened. Between the lower border of the tube and ovary there is an irregularly shaped sac in collapsed condition measuring 5 centimeters in diameter and lined by a shaggy dark red membrane. Adherent to these shaggy villous-like projections are masses of clotted blood. Under the microscope sections of the tubal wall show an attached placenta. At points the chorionic epithelium extends into the thin wall of the tube for some distance and there are masses of these cells in the lumina of some of the veins. This involvement of the wall of the tube is more extensive than usual and justifies the term chorio-epithelioma.

Diagnosis. Primary chorio-epithelioma of tube following ruptured tubal gestation.

Two years after operation the patient is in the

st health. Her menses are normal, lasting three or four days. Her work is arduous assisting her husband in a grocery store from early morning until late at night besides which she attends to her regular household duties and takes care of her children and with all this hard work she says she has never felt better in her life.

Leipmann strongly emphasizes the fact that sharp differentiation should be made between primary chorio-epithelioma of the tube and the so-called ectopic chorio-epithelioma. The term ectopic chorio-epithelioma should be reserved for only those cases that designate the location of the primary growth in other structures and away from the ovumidus or placental site and entreats that it is incorrect to apply the term to primary tubal tumors that originate at the placental site. Metastatic or secondary growths occur from the tubal growth just as readily as they do in uterine variety. But also after a tubal pregnancy an ectopic chorio-epithelioma of primary growth remote from the tubal placental site has been described.

Primary chorio-epitheliomatous tumors remote from the placental site of the uterus and fallopian tubes have been observed in 21 cases by Findley. In no instance was it possible to trace a direct anatomical connection between the placental site and the primary tumor. The tumors arose during the course of pregnancy at varying periods after the completion of normal pregnancy and following complete and incomplete abortions. In nearly all cases it has been possible to trace a direct clinical relation between the pregnancy and the tumor formation. The vagina is most often the seat of secondary invasion of metastases in cases of primary chorio-epithelioma of the placental site but it is also true that it is the most frequent site of a primary growth. Findley reported 14 such instances in the 21 cases collected by him. The interval between the last known pregnancy and the development of a chorio-epithelioma varies considerably. It usually

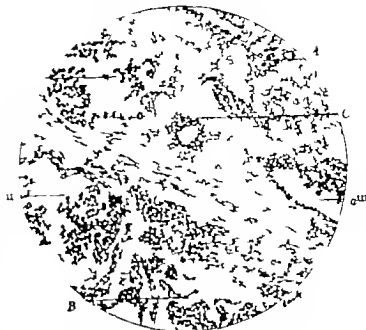


Fig 1. Primary chorio-epithelioma of fallopian tube following ruptured tubal gestation. A. Uterine neoplastic cells in lumen of blood vessel. B. Tubal lumen. C. Perivascular small round cell infiltration.

occurs shortly after the termination of the pregnancy or may be delayed several years after the last labor or abortion. Recently Outerbridge (6) reported a case of a primary chorio-epithelioma of the vagina that developed eight years after the last known pregnancy. In one of the three cases of chorio-epithelioma of the uterus that I exhibited before the Pathological Society of Philadelphia last year the tumor developed at the placental site in the uterus six years after the last known pregnancy. The onset of symptoms in this patient developed three years after the menopause had occurred.

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CHONDROMA OF THE PELVIS¹

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NUMEROUS articles have been written upon true chondroma and other forms of cartilaginous tumors arising from various parts of the body. These tumors whether enchondroma, echondroma, osteochondroma, chondrosarcoma, or osteochondrosarcoma were, by most authors and especially those of the earlier times, classified as enchondroma. Since 1836 when Jean Muller gave the first complete description of enchondroma, until the present day a hundred or more articles upon the subject are readily found in the literature. Most of these articles appeared in the French and German literature before 1890. Since then relatively few reports have appeared and only a few of them, dealing mostly with the report of cases, in the English. In this paper I have attempted to summarize the work of others as well as give a description of three cases of enchondroma of the pelvis coming under our observation.

Chondromata are tumors composed of cartilage-cells with a varying amount of matrix and connective tissue stroma. These tumors may be composed of any of the three types of cartilage, hyaline, elastic, or reticular or may be composed of any two or all three types with variable proportions of each. However the tumor most frequently met with is that of the hyaline variety. In the latter there is an attempt to reproduce the true hyaline cartilage, with relatively few cells scattered sparsely throughout a homogeneous matrix.

Classifying chondromata according to their manner of origin they are spoken of as echondromata or enchondromata. Echondromata are outgrowths of cartilage occurring in regions where cartilage is normally present, as in the region of a joint, the larynx or trachea. Such a tumor results through a process of hyperplasia or overgrowth of cartilage. Echondromata are homoplastic. The enchondromata on the other hand are masses of cartilage or cartilaginous tumors having no

connection with areas of normal cartilage formation. These are considered under the heteroplastic group and develop where cartilage is not normally found.

In the gross these tumors vary considerably in shape and size. They are as a rule, irregularly globular and range from the size of a hazelnut to a mass 100 centimeters in circumference. They may be single or multiple. As a rule and especially those which attain a large size present a lobulated surface and are attached to the parent tissue in a sessile manner. They are surrounded by a capsule of fibrous connective tissue which sends trabeculae into the tumor dividing it into many lobules of variable size. These trabeculae carry nutrient blood and lymph vessels. In color these tumors vary from white to bluish gray.

On section, the cut surface presents a bluish ground glass appearance in which white bands of connective tissue divide the tumor into various sized lobes. In consistence the enchondroma is elastic, but this may vary from a soft and gummy character to bony hardness.

Degeneration of these tumors due to the limited supply of nourishment of those portions of the lobules most removed from the trabeculae which carry the blood and lymphatic supply is quite frequent. The degeneration may be myxomatous, calcareous or fatty and in frequency occurs in the order named. Occasionally a well-defined mass may undergo myxomatous degeneration leading to the development of a true cyst, or the whole tumor may be composed of a myxomatous matrix in which very few cartilage-cells are seen, a myxochondroma. Some specimens show the deposition of calcium salts in the matrix with a shrinking of the cartilage-cells giving rise to a type of calcareous degeneration but without bone formation. Fatty degeneration is described by some authors as an overabundance of fat droplets in the cellular cytoplasm, where it is normally present.

Degeneration is more likely to occur in those tumors of the homoplastic group or echonchondromata where the trabeculae are not so abundant and where there is less tendency to form lobules.

The pelvis in view of its embryological development and numerous centers of ossification, its articulation and relation to other parts is a not uncommon site of chondromata and has many locations from which they may arise. These are (1) from cartilage at the symphysis pubis (2) from the cartilage of the ischiosacral synchondrosis (3) from the cartilaginous disc at the sacrovertebral articulation and (4) from the cartilage of the acetabulum. The tumors arising from the above named places are of the enchondroma group. However they may also arise from cell rests which may be located at (1) the junction of the ascending ramus of the ischium and the descending ramus of the pubis (2) the junction of the acetabulum and the ilium ischium or os pubis (3) any portion of the pelvic bones where connective tissue exists or (4) the tumor may arise by extension of growth from the surrounding parts. These are of the nature of enchondromata.

Clark reported one case of chondroma of the pelvis occurring in a middle aged woman. This was first observed as a tumor above the hip and in the presence of other signs a diagnosis of medullary cancer of bone was made. The patient became rapidly emaciated anæmic and died. At autopsy all of the os innominatum was involved in a tumor mass. The tumor measured $8\frac{1}{2} \times 9$ inches filling the pelvis and displacing the rectum, vagina and bladder. Microscopic examination showed the tumor to be entirely composed of cartilage and its malignancy was due to its position.

An enchondroma of the pelvis developing at the site of injury was described by Potter. The patient was a female 37 years old who gave a history of a fall ten months previously and two days before confinement. In falling she struck her buttocks on a stone floor. The injured area was quite painful and tender for a few months. Five months after the injury she noticed a small hard swelling on

the right buttock. The mass enlarged and grew along the ascending ramus of the ischium and descending ramus of the pubis reaching the size of a six months foetal head. It filled the pelvic outlet causing difficult urination and defecation and preventing intercourse. At operation the tumor had an irregular surface and was covered by a fibrous capsule. Microscopic examination showed it to be composed of a fibrillated cartilage frequently showing several cartilage-cells in single lacunae. Many areas of calcareous degeneration were present in the tumor.

Several other similar cases with a history of trauma at the site of tumor formation have been described by Halthouse and others. In his researches Wartmann described eight enchondromata two from the pelvis four from the hand one from the lung and one from the parotid gland. He has studied some five thousand sections of these tumors with the following conclusions. He confirms the opinion of Virchow who indicated that enchondromata arise from connective tissue. He also claims that by a process of metaplasia the endothelium of lymph and blood vessels may give rise to enchondromata and further that many chondromata arise from cartilaginous emboli within the blood vessels.

The following are three cases of enchondromata of the pelvis which have come under our observation. The first two originated in the pelvic bones while the last had its origin in the femur and by metastasis extended to the pelvis.

CASE 1. Mr. E. H. K. age 38 years. Occupation, farmer (white). He has always had good health. Two years previously the patient received a sharp injury by being thrown on an iron rod. It did not trouble him much at the time, but later he noticed a small growth at site of injury.

On examination there was found on the inside of the left thigh and below the perineum a hard immovable growth about the size of a man's fist adherent to bone. The soft tissues over it were not involved. The glands were not enlarged. He was not inconvenienced in walking. There was slight pain which radiated toward the knee. There was no castration nor loss of weight. His general condition was good.

An operation was undertaken under general anesthesia. An incision was made along the inner side of the thigh transverse to the tumor. The tumor which was adherent to the fascia and arose from

the ascending ramus was chiseled away from the bone and some of the tissue in the neighborhood was removed. Recovery was good. The patient left the hospital 4 days after entrance and thirty-nine days after the operation.

Pathological examination. This tumor was a large mass about the size and shape of a man's fist. It measured $0 \times 7.5 \times 6.5$ centimeters. The surface was very irregular and nodular. It was composed of nodules varying in size from pin head to a marble. The tumor was covered by a capsule of dense connective tissue of a glistening character. Scattered diffusely over the tumor mass were small lobules of yellow fat. These were bound to the fibrous tissue capsule. Over about one-fourth of the surface the capsule was missing. Here the tumor had been separated from its attachment. This part was very rough and had many fibrous tags hanging to the surface. In many places it had the appearance of the pulp of an apple and was finely granular. This cut portion was studded with fine chalk like areas varying in size from pin head to a large pea or bean. These areas were very irregular in outline and of a calcareous nature.

On cutting through the tumor it was found to be composed of many distinct nodular masses of cartilage. Each mass was definitely outlined but was united to the neighboring lobules by dense fibrous tissue. The cut surface was of bluish gray color and had a finely granular or frosted appearance. In the center of several of these there were irregular chalky masses of calcification. Throughout the tumor there were thick strands of dense white fibrous tissue.

Microscopic sections of the tumor showed it to be mainly composed of cartilage and fibrous tissue. The latter save for the main trabeculae as small in amount and passed through the mass in all directions, dividing it into small lobules. This connective tissue stroma was loosely arranged and contained relatively small number of nuclei.

In some parts of the sections the lobules of cartilage were mainly composed of a clear hyaline matrix in which the cells were sparse. The cytoplasm of the cells was contracted leaving almost vacant lacunae save for the centrally placed nucleus. Again in other places the cells were more abundant and the matrix less in amount. This did not have the appearance of mature hyaline cartilage but had a streaked appearance due to prominent fibers in the matrix. Here the cartilage was not arranged in the well-defined lobules, but had an irregular architecture with ill-defined borders. At times it was difficult to differentiate true cartilage-cells from the fibrous connective tissue cells of the trabeculae.

At the border of the sections and adjoining the fibrous stroma, the cartilage-cells were lying in meshes of collagen fibers of the connective tissue but as one advanced from the fibrous trabeculae the cartilage-cells took on a more mature appearance and the collagen fibers became fewer in number gradually disappearing from the hyaline

matrix. The cell walls were very indistinct and could not always be made out. This was particularly true where the cartilage was more mature. In other parts of the specimen, as many as ten cartilage-cells were surrounded by a single indented capsule. **Diagnosis** Chondroma of the ischium.

CASE. Mr. J. B. age 5 years. Occupation, carpenter (negro). Patient had been in good health until 8 years ago (34 years) when he had typhoid fever. He made a good recovery and was perfectly well till five years ago (47 years) when he had trouble with his bowels and was compelled to use purgatives. Gradually but slowly constipation became more marked. Two years ago he had frequency of micturition, associated with some pelvic pain. Gradually but slowly his condition became worse. Six months ago he noticed a hard firm enlargement above spine of the left pubic bone. Being a carpenter he attributed the development of the mass to injury occasioned by the use of a saw. This tumor gradually became larger. One month ago he noticed a similar mass at the right of the pubis. It progressively became more constipated and emaciation was more frequent. He has not lost much (if any) weight.

On examination he appeared to be fairly well-nourished man. A firm tumor was found projecting above the pubis on either side and filling up the anterior portion of the pelvic cavity. The finger could be inserted into the rectum for a distance of about one inch. There appeared to be but a small space posteriorly to the bowel. Examination elicited no tenderness.

A large nodular mass composed of numerous lobules of bluish white color was removed from the posterior surface of the horizontal ramus of the pubic bones. The tumor extended laterally on both sides of the symphysis. The patient made an uneventful recovery.

Pathological examination. The tumor mass was very irregular and nodular and composed of various kinds of tissues. It had the shape of a large potato and measured $3 \times 7.5 \times 5.5$ centimeters. The tumor was covered by an irregular manner by a fibrous capsule to which many fibrous tags were attached. There were many thick fibrous bands running over it in various directions. In places the tumor was of firm bony consistency in others it was more elastic and at times it even appeared cystic. There were about thirty smaller pieces of tumor which during removal had been separated from the main mass. They varied in size from a walnut to one-third the large tumor and were similar to it in structure.

For the most part the tumor was occupied by lobular masses of cartilage which had a dense bluish white, glistening appearance, and surrounded by a definite fibrous capsule. On section, some of these masses of cartilage seemed to coalesce with the neighboring masses. In other parts, they existed as separate lobules and were attached only through intervening thick bands of fibrous connective tissue. These bands traversed the tumor in all directions

nd appeared to arise from the surrounding fibrous capsule. On closer inspection this artilage was a bluish-gray color it was smooth and had the appearance of frosted glass. This artilage was quite elastic. In another portion of the tumor there was some firm white calcified tissue which was irregular and nodular representing or suggesting calcification of definite artilaginous nodules. These calcified areas could easily be broken into small nodular masses each of which was separated from the next nodule by a capsule.

Attached to and embedded in the dense fibrous capsule was a mass of fat which was of a dull yellow color. On section through the cystic portion of the tumor the interior was found cavitated in a very irregular manner. These cavities extended through the tumor mass in many directions. The artilaginous substance in this region and surrounding the cavity was very soft and easily broken. In the thick bands of connective tissue were many congested blood vessels. The tumor had in places a pink hue.

Micoscopic sections of the tumor showed it to be composed of a hyaline cartilage. The cells were of various sizes and shape and lay in lacunae surrounded by a matrix of varying consistency. Groups of cells loosely or loosely arranged were found. The cells were mostly oval but a gradual transition from stellate to oval forms were also frequently seen. Some of the cells were surrounded by a capsule or thickened portion of the matrix. Others showed no capsule; however and still others showed a single capsule surrounding from three to twelve cells. In some of the cells a fine network was seen extending from the contracted central mass to the cell wall. Running through the tumor were strands of fibrous connective tissue which contained blood vessels. Several of these were seen to change by gradual transition into artilage cells of the hyaline variety. The artilage gradually assumed a more adult type as one advanced from these fibrous trabeculae inward. The matrix of the cartilage had a homogeneous pink hyaline appearance. In some places however minute fibers could be distinguished in this substance.

CASE 3. Mr. S. age 18 years. Occupation, student (white). For the clinical report I am indebted to Dr. B. Z. Cashman of the St. Francis Hospital. About five months previously a small growth was noted on the external surface of the right femur. Two months later this had extended to the inner side of the shaft. The patient lost five pounds in weight during the last few months. There had been some pain in the femur for the last month and some discomfort on the side of the right hip.

A firm mass was found over the inner part of the right thigh from trochanter to middle third. There was no pain on pressure. No change was to be observed in the overlying skin or veins. No other mass was present in the pelvis. The X-ray showed an egg-shaped softening below the greater trochanter.

On January 21, 1915 a small piece was excised

for examination and a diagnosis of chondromyxoma was made. A no anesthetic was added suggesting liability to recurrence.

An operation was undertaken for the removal of the growth. The mass was easily tripped from the femur and pelvis by the hand. While removing the tumor a sensation like running the hand through a ball of raked ice was obtained. The operation was followed by treatment with the actual cautery. Patient discharged February 5.

March 1, 1915. One and one half months later a mass the size of the original was found beneath gluteus maximus and attached to the femur and ilium. This mass was also removed and autopsied April 3, 1915. No evidence of recurrence. April 4, 1915. A mass was noted below the descending ramus of pubis and attached to the femur. Patient was referred to an X-ray expert who treated the case for four weeks with X-rays. The mass became softer but larger. The patient then sustained a pathological fracture of the femur. A sinus developed and blood drained from the area of injury. July 1. The patient was treated at Baltimore for 43 hour continuous radium. The mass continued to grow. October 10, 1915. Patient home. Marked edema and redness over the mass which appeared smaller. General health somewhat improved. February 1916. Patient died. No autopsy.

Pathological report (January 1, 1915). There were received numerous small irregular pieces of soft cartilaginous tissue representing a tumor about the head of the femur. The largest of these masses was 4 x 3 x 5 centimeters. These pieces of tissue were of a pale translucent appearance. The tissue was of the peculiar consistency of young cartilage and was quite friable. Running through it were strands of fibrous tissue forming trabeculae and carrying small blood vessels. The tissue was of a uniform structure and appearance. The cut surface was smooth glassy and firm. No areas of necrosis were observed. The tissue was distinctly translucent and in the smaller pieces which were very numerous and sometimes blood stained, the fibrous trabeculae stood out quite prominently as opaque, white strands. A firm stroma was seen to penetrate the solid gelatinous substance from these trabeculae. In many of the smaller pieces the surface was gritty owing to the presence of small particles of calcium salts. One small piece not over 1 centimeter in diameter consisted chiefly of compact cancellous bone. This was covered on one surface by the cartilaginous tissue.

Micoscopic. Sections of the tumor mass showed it to be composed of a matrix of a hyaline character in which many cartilage-cells were found. These cells were of irregular size and shape some being oval large and multinucleated. Many were spherical having a wide protoplasmic rim and contracted lacunae. Others were rather spindle shaped or stellate. No mitotic figures were observed. The cells were rather loosely distributed and nowhere

tion and growth of bony and cartilaginous parts are much retarded.

Enchondromata may also result from an inclusion of cartilage-cells (anlage) during the development of certain organs. Those likely to occur in the pelvis are enchondromata of an undescended testicle or an ovary. These organs are developed in close apposition to the vertebral column and may include an anlage of cartilage from the intervertebral discs, which later may take on the power of growth and give rise to a tumor. This was shown by Virchow to be the probable source of enchondromata of the parotid gland in which an anlage or inclusion was obtained from the branchial arches.

Francois reported a case of enchondroma of the ovaries occurring in a patient 74 years of age, but does not give any view as to their mode of origin. On the other hand Wartmann in his classical researches upon enchondromata has observed and described the endothelium of the blood and lymph-vessels retroverting to a type of embryonic mesodermal tissue from which it then developed into cartilage-cells and formed tumors.

Enchondromata of the pelvis usually develop during the third and fourth decade. Of the 60 cases reported in which attention was called to the age of the patient, 46 have occurred between the age of 20 and 40 years, and 29 of these between 30 and 40 years. Considering these tumors in the order of their frequency in particular locations those arising in the pelvis stand fourth the bones of the hand femur and tibia respectively being more frequently involved in the order named. In these latter locations, they very often are the late outcome of arthritis and particularly of arthritis deformans. Heredity seems to play little or no part whatever in the development of chondromata, although those occurring on long bones have been found in three successive generations. These tumors occur about equally in both sexes. Of 105 cases reported, 59 occurred in females.

Considering these tumors in regard to their rate of growth and duration one can say very little, as they are usually removed surgically at an early period. However one can say that they are, as a rule, of slow growth, but

may suddenly take on the qualities of rapid growth and cause the death of the patient. Livert in his statistics on enchondromata in general taken before the days of modern surgery reports 12 cases lasting from one month to two years before death 11 cases from two to ten years 12 cases of ten to twenty years duration and 3 cases more than forty years duration.

Many enchondromata of the pelvis are clinically malignant mainly because of their position in relation to the various pelvic organs. This was the more true before the days of antiseptic and aseptic surgery when the tumors were allowed to develop to an enormous size. Some of these tumors possess characters of true malignancy as is shown in one of our tumors having metastases. This process it is pointed out by Wartmann, takes place by the development of buds which grow into the lumina of vessels are broken off and carried to distant parts. The organ most frequently involved is the lung. Some of the tumors spread to distant parts by continuity and in this way show their malignancy. This is more apt to occur in tumors of a soft character whose cells are irregular in size and shape and simulate in appearance embryonic cartilage-cells. The matrix of these tumors is soft and of a gelatinous nature often myxomatous. This is well shown in our Case 3 with metastases involving the pelvis. Francois cites a case reported by M. Dolbeau showing a metastasis of enchondroma of the tibia to the pelvis. The more cellular these tumors are the more prone they are to develop typical sarcomatous masses of fibrous type.

Gibbs reported a case of enchondroma in the breast of a bitch growing side by side with a sarcoma, but having no connection with it. In some instances it was impossible to differentiate the two types of cells save by special staining methods. It is possible that many cases of this kind with metastases and other signs of malignancy have occurred in the human, and hence reported as malignant enchondromata.

Enchondromata may be differentiated in the gross from similar growths by observance of the following. These tumors are definitely

outlined and globular in shape while malignant tumors are irregular in shape and outline. Pain is not so marked if present at all and not of the lancinating type as sometimes found in malignancy. Pain in exostoses is present from the beginning while in enchondromata it is absent until the growth is quite large. There is no involvement of lymphatics and only in rare cases are the blood vessels engaged. Keen is of the opinion that enchondromata arising in children are usually benign while those arising in later years are more liable to become malignant.

From our experience and study as well as that of others it is evident that enchondromata of the pelvis most frequently arise in fibrous connective tissue and develop through a process of metaplasia following a stimulus usually a definite injury. Furthermore their clinical malignancy is mainly dependent upon their position and only rarely do they adopt a sarcomatous character and show true tissue malignancy.

I wish to acknowledge the valuable assistance given me by Dr O Klotz in the preparation of this paper.

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DEPARTMENT OF TECHNIQUE

THE APPLICATION OF ANOCI-ASSOCIATION TO OBSTETRICS

THE COMBINED USE OF SCOPOLAMINE NITROUS-OXIDE-OXYGEN AND LOCAL INFILTRATION

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IN a paper read before the Pan American Medical Congress last June (1) I pointed out the way in which the principles of anoci-association could be applied to obstetrics. I wish briefly to review these points before reporting the results of my work since that time.

The principles of anoci-association are too well known to need description here. The acceptance or rejection of this system constitutes one of the most warmly debated subjects of present day surgery. There are those who are firmly convinced of its merits and others equally sure that it is only a fad, soon to follow the numberless panaceas once hailed with enthusiasm but now forgotten. Whatever may be its future as a system, it has already left its mark upon the technique of every clinic in promoting the more careful handling of tissues, sharper dissection and reduction of trauma.

The principal objections seem to be that there is a lack of muscular relaxation under nitrous-oxide-oxygen, and that there is difficulty in securing it by local nerve-blocking.

During the past three years it has been my good fortune to study a large number of cases operated under nitrous-oxide-oxygen and anoci-association. This experience has convinced me that success depends almost entirely on the care and thoroughness with which the local infiltration is done and those who have succeeded have done so by making the nerve-blocking as complete as that necessary for operation under local anesthesia alone.

Since the appearance of the articles by Webster (2) and Lynch (3) in March, 1915, the use of nitrous oxide in obstetrics has rapidly increased. When we remember how many surgeons have discarded it on account of the lack of relaxation in the abdominal wall we cannot help feeling that the percentage of severe perineal tears must rise, unless the pelvic muscles should happen to be very different in their reactions under the gas. Since there are no reasons for expecting such a

difference, I believe we should be prepared to meet the difficulty. One way would be to change to one of the more relaxing anesthetics such as ether or chloroform at the time of delivery; another would be to use nerve blocking locally. If relaxation can be secured in the abdominal wall by the use of novocaine and quinin urea, it seems likely that the same results could be obtained in the perineum.

Of the 30 cases receiving perineal injections, 20 were given nitrous-oxide only. Group I, four were given nitrous oxide-oxygen until the time of actual delivery when chloroform or ether was substituted; Group II, and six received chloroform in the usual way. Group III. The perineum in all cases was injected with 0.25 per cent novocaine varying in amounts from 60 to 150 cubic centimeters. Eleven received in addition from 30 to 40 cubic centimeters of per cent quinin urea solution each. The maximum amount of the two solutions injected in any one case was 175 cubic centimeters. The injection was made as the head appeared in sight. The vulval edges were turned back and a long needle was inserted at the mucocutaneous border the fingers of one hand being in the vagina to note its position. At this period the perineal floor is flattened out by the oncoming head, but not stretched to any degree. Even though the field is large both the levator ani muscles and the perineal body can be readily infiltrated. Novocaine was injected first and the quinin-urea immediately afterward, when used.

For the purposes of this paper we are concerned chiefly with the 20 cases in Group I that received nitrous-oxide-oxygen only. Seventeen of these received from one to five doses of scopolamine during the first stage before nitrous-oxide-oxygen was begun. The initial dose of scopolamine was 1/300 grain combined with either morphine 1/6 grain or narcophin 1/5 grain. This was followed usually at irregular intervals by the same dose of scopolamine without the

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TABULATION OF CASES

	Group I					Group II					Group III				
Number of Cases	10					10					10				
Received	Private					Hospital					Private				
Age	Average 28					Average 28					Average 28				
Parity	Primiparae					Primiparae					Primiparae				
Position	R A L A R P A L O A					L O A R A R P P					L O A R A R P P				
First stage	Average 1.5 hours					Average 1.5 hours					Average 1.5 hours				
Second stage	Average 1.5 hours					Average 1.5 hours					Average 1.5 hours				
On perineum	Average 1.5 hours					Average 1.5 hours					Average 1.5 hours				
Scopolamine	Average 1.5 hours					Average 1.5 hours					Average 1.5 hours				
Personal injections	Average 1.5 hours					Average 1.5 hours					Average 1.5 hours				
R. laborious	Average 1.5 hours					Average 1.5 hours					Average 1.5 hours				
Lacerations	Average 1.5 hours					Average 1.5 hours					Average 1.5 hours				
Forceps	Average 1.5 hours					Average 1.5 hours					Average 1.5 hours				
Baby	Average 1.5 hours					Average 1.5 hours					Average 1.5 hours				

morphine or narcophin. In four of the prolonged labors a second smaller dose of either the morphine or narcophin was given. These drugs were given first to reduce the amount of gas used and secondly because many of the nervous patients became more quiet and took the anæsthetic better.

It should be emphasized that an excessive amount of scopolamine often proves worse than none because the patient must be mentally clear to give the proper co-operation with gas analgesia. In none of these cases was the amount sufficient to produce anywhere near the mental condition observed in so-called twilight sleep. I believe its use in these amounts is just as advisable in obstetrics as in general surgery and for the same reasons.

Nitrous-oxide-oxygen analgesia was begun before the end of the first stage or at the beginning of the second according to the distress of the patient and to her ability to pay for the gas.

Pain. There was a marked difference between the private and the clinic patients in regard to the success of the procedure as far as pain is concerned. The private cases all intelligent women schooled in the part they were to play and at

tended by professional anesthetists suffered very little. Some of them had absolutely no pain others asked for more anæsthetic and complained of distress but after it was all over could not remember having had much pain. In the other group of clinic cases conditions were less favorable. The women were less intelligent some could not even speak English. With the first few cases the anæsthetic was given with a new type of machine by men unskilled in the use of gas. Under these circumstances in some cases the gas did not give enough relief so that chloroform or ether had to be substituted. These are the cases that make up Group II. Later better results were obtained as regards analgesia but still not as good as in private cases.

During the delivery of the head analgesia was succeeded by complete anæsthesia in all cases. I believe this is an important point. It greatly lowers the danger from those sudden expulsive contractions which so often produce tears. It has been found advisable after years of experience with chloroform and I do not see why it should not be used with nitrous-oxide-oxygen. In fact the indications for complete anæsthesia are greater with such a light anæsthetic.

In the first 20 cases, delivered under nitrous-oxide-oxygen and anocid alone nineteen were primipara and the other a II-para. The ages varied from eighteen to thirty-one, the average was twenty three years. In all but one, the position was left occipito-anterior or right occipito-anterior. One was a right occipito-posterior which persisted and was delivered as a brow with low forceps. In spite of this complication, the nitrous-oxide-oxygen worked satisfactorily.

Length of labor As far as they go the figures in the nitrous-oxide-oxygen cases indicated shortening of the second stage. The time averaged one hour and forty minutes, which, I believe is less than is usually seen in a similar group of primiparae. Certainly the time was not lengthened.

Forceps Forceps were used three times. Of the two low forceps cases, one was the brow delivery just mentioned. In the other they were used to terminate labor after the head had been on the perineum one hour. In a third, mid forceps were resorted to because the fetal heart had dropped to 100. This last case had received nitrous-oxide-oxygen during the pains for thirty minutes only. It does not seem then, that the need for forceps in any one of these cases could be attributed to the anesthetic.

Lacerations Careful records were kept even the first degree lacerations, small skin or mucous tears were noted. These were present in 10 cases. In the 20 cases there were only three second degree lacerations, each one of which was to be expected under the conditions present. The first was in the mid-forceps case already described the second had a contracted outlet and in the third, the head was born unattended.

Perineum The perineum in the 30 cases were watched carefully for complications attendant upon the injection of novocaine and quinin urea. No abscesses, sloughs, areas of redness or infiltration occurred. In a few cases, there was some edema and considerable tenderness on the second and third day but apparently on more than in other cases in which it was not used. Those perineae that had to be repaired healed promptly.

Perineal injections There is no doubt in my mind that the novocaine did improve the relaxation. The perineum is a large field to be thoroughly injected, but the distribution of these large quantities of solution is materially aided by the pressure of the head against the muscles. The quinin urea¹ in the quantities used was apparently of little service in relieving

the soreness after delivery but it may have aided in keeping up the local anesthesia in the more protracted cases.

Babies All but two of the babies in the 30 cases were born alive pink, and in excellent condition breathing spontaneously. One was still-born at about eight months. No fetal heart had been heard for several days. In the other case the mother a III para had been sent in from the Out-patient Department because the fetal heart had gone up to 170. The cervix was stenosed mid forceps had to be applied and the child was born with the cord tightly coiled about its neck. Nitrous-oxide-oxygen had been given for only fifteen minutes, followed by ether for one hour. This child could not be resuscitated and death was plainly due to suffocation on account of delay in delivery. In neither of these cases, then, can death be attributed to the nitrous-oxide-oxygen.

CONCLUSIONS

1 In conclusion I wish to emphasize that this experience, brief as it is is in accordance with that accumulating rapidly on all sides today that nitrous-oxide-oxygen analgesia is safe to both mother and child.

2 The use of limited amounts of scopolamine during the first stage is a distinct advantage, shortening the time during which gas is required and making the analgesia more complete.

3 The work done so far has encouraged me in the belief that the injection of the perineum is a distinct help in securing relaxation of the outlet. This point gained, gas-oxygen in experienced hands will do as well as either chloroform or ether. The lack of any complication whatsoever resulting from the perineal injections should encourage those who feel timid about its use.

4 The combined use of scopolamine nitrous-oxide-oxygen, and local infiltration offers a practical and efficient means of conducting labor and extends analgesia in its broadest sense to the obstetrical field.

In closing it is a pleasant duty to thank Dr. Breitstein for the generous and open minded way in which he gave me access to material at the University of California Hospital. I wish also to thank Drs. Seaver and Gelston for their valuable help in carrying out this work.

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¹ It should be remembered in using anocid-injections that quantities must not be used on the skin, mucous membranes, gums or cervix as sometimes produces sloughs in these tissues.

PERINEAL ANÆSTHESIA IN LABOR

BY ROBERT W. KING, M.D., DENVER, COLO.

WHILE marked advancement has been made in the realm of anesthesia as applied to the local and general blocking of the sensory nerves of various parts of the body, it is strange that so little attention has been paid to applying these methods to the sensory innervation of the female perineum—especially since the agitation of twilight sleep has engaged the attention of profession and laity. The literature of this subject is remarkable because of its scarcity; the subject apparently has not engaged the attention of American investigators and practically the only work of importance that has come to my notice has been carried on in Germany.

What work has been done has been directed toward the blocking of the pudic nerve but this has not received the attention it deserves.

The pain of the dilatation of the cervix is not of the same intensity as that suffered by the birth of the head and seldom requires anesthesia of any sort. The suffering caused by the advancing presentation on the perineum has been attributed to the stretching of the soft parts and this pain is always more severe in primipara than in multipara.

A further knowledge or understanding of the sensory innervation of the female perineum and the part played by Colles' fascia in the production of pain in childbirth will modify this view and a better understanding of the anatomy of the part will lead to better success in attempting to block the nerves.

By blocking the pudic nerve in the ischio-rectal fossa there will be a fair degree of anesthesia of the anterior triangle and perfect anesthesia of the posterior. The anesthesia of the anterior portion will not be perfect because part of its sensation is derived from the inferior pudendal, genitocrural and ilio-inguinal nerves (Fig. 1) that do not enter the posterior triangle. The major portion of the pain in the second stage of labor is due to the stretching and rupture of Colles' fascia which is more sensitive than the integument of the part and which also varies in density and elasticity in different subjects. As Colles' fascia is always more or less torn in the primipara and not so frequently or to so great an extent in multipara it is readily seen why the suffering is more intense in the former than in the latter.

Anatomically Colles' fascia corresponds to the

lateral extension of the hymen and like that structure it possesses great sensibility to pain. If this point is fully understood and the sensory paths and fascial planes (Fig. 2 and 3) are studied in the illustrations it will be possible for the general practitioner to safely and easily block the sensory innervation and deliver the patient painlessly or at least with a minimum degree of pain rendering the employment of other anesthetics unnecessary.

My former objection to blocking the nerve in the ischio-rectal fossa has been because of the low vitality of this fat-filled space and the possible danger of puncturing the pudic artery.

Infiltration of the fossa has not been followed by any adverse circumstances however and I am now blocking the nerve of both the anterior and posterior triangles of the perineum in women who have given birth to a number of children or who present evidence of much laceration of Colles' fascia.

There are many apparent advantages of this method over the administration of general or spinal anesthesia in childbirth or gynecologic operations which make it very desirable that it should receive a thorough trial in clinics having suitable material.

I have had much difficulty in working out the innervation and fascial planes as here given owing to the lack of suitable material in the dissecting room and the fact that the published works on anatomy that I have had access to have with one exception dismissed this important part by referring the student to the male analogues. The later works on obstetrics and gynecology have also shown an unexpected lack of knowledge of this subject due perhaps to the supposed unimportance of an intimate knowledge of the female perineum to the general practitioner.

ANATOMY

The pear-shaped space of the perineum is divided into an anterior and posterior triangle by a transverse line passing between the tuberosities of the ischium midway between the anus and vagina. The lateral angles of the anterior portion vary greatly in different subjects and the tuberosity must be carefully palpated and the proper injection chosen in reference to the parts to be anesthetized. The anterior triangle contains all the sensory nerves innervating the perineum in the third degree laceration extending just to the

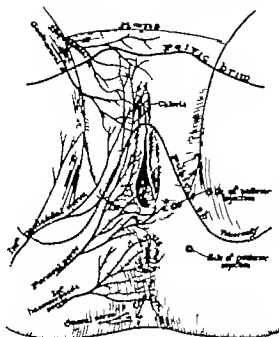


Fig. 1. The right side shows the distribution of the sensory nerves of the female perineum. The left side shows the landmarks and sites for entering the needle in blocking these nerves in labor or perineal operations.

The posterior triangle contains the sensory nerves of the region to the coccyx, the anus, Colles' fascia and the triangular ligament, and a part of the periphery of the anterior triangle.

Fascial planes The superficial fascia of the anterior triangle consists of two layers; the peripheral layer contains fat and varies in thickness in different women (Fig. 3); it is continued over the posterior triangle forming a meshwork containing the fat of the ischioanal fossa. The second or superior layer of the superficial fascia of the anterior triangle is Colles' fascia and is an aponeurotic membrane which is very sensitive to pain. Passing forward this layer is represented by Scarpa's fascia of the abdomen and the suspensory ligament of the clitoris. Across the vaginal orifice it is represented by the sensitive hymen. Posteriorly it is reflected behind the transverse perineal muscles and blends with the two layers of the triangular ligament and the perineal body, laterally Colles' fascia is attached to the rami of the pubic arch. This fascia forms the floor of the superficial perineal interspace the roof being the inferior layer of the triangular ligament.

The deep perineal fascia is the urogenital diaphragm or triangular ligament. It also consists

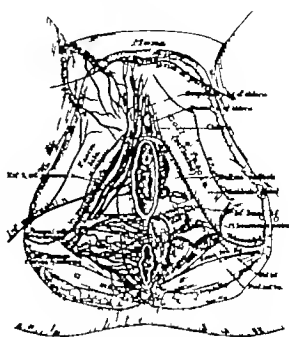


Fig. 2. Dissection of the female perineum. On the right side Colles' fascia is removed showing the sensory innervation and blood supply of the superficial perineal interspace and ischioanal region. On the left side Colles' fascia is reflected showing the cuticular bulb and gland and the inferior layer of the triangular ligament cut to show the artery of the bulb in the deep perineal interspace. In the ischioanal fossa the anal fascia is removed and the space cleared showing the location of the pudic vessels and nerves.

of two layers that become continuous behind, blending with the perineal body and Colles' fascia. Anteriorly these layers are separate, laterally and anteriorly both layers are attached to the pubic arch and between them is situated the deep perineal interspace.

A study of these fascial planes demonstrates the ease by which the spaces may be infiltrated and the contained structures subjected to the influence of the solution for a considerable time, owing to the impervious nature of the fasciae and their attachments, when intact making it impossible for the solution to escape except anteriorly from the superficial interspace beneath Colles' fascia.

The perineal spaces The superficial interspace contains all of the sensory nerves of the anterior triangle except a few fibers of the genitocrural and ilio-lingual nerves. It also contains the principal vessels, the superficial muscles, and the vestibular bulb and gland (Bartholin's gland) the location of which must be remembered or failure may result if injection is made into them

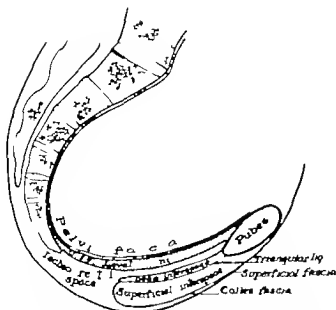


Fig. 3 Diagram illustrating the fascial planes and spaces governing the extent of the anæsthetic infiltration. Note the anterior projection of the ischio-rectal space.

The deep perineal interspace contains no nerves necessary to block in labor the dorsal nerve of the clitoris which enters this space leaves it and passes into the anterior portion of the superficial interspace.

The ischio-rectal fossa is generally stated as being situated in the posterior triangle but reference to Figs. 3 and 4 will show that there is an anterior projection between the levator ani and the superior layer of the triangular ligament passing nearly to the symphysis. The solution will readily infiltrate the loose tissue of the space but it is necessary to use a greater amount than in the anterior injection. Alcock's canal which is a sheath formed by the obturator fascia contains the pudic nerves and vessels supplying nearly all the structures of the perineum. The situation of this structure about 4 centimeters above the margin of the tuberosity marks the depth to insert the needle for the injection. Care must be used not to make the injection into the obturator muscle or the dissipation of the solution may prevent sufficient anæsthesia of the perineum. If the solution is injected into the fossa it will have effect upon the perineal nerve and also the hæmorrhoidal and sacral nerves giving sensation to the structures of the posterior triangle.

TECHNIQUE

1 Prepare a 2 per cent solution of novocaine in normal saline sterilize it by boiling allow it to cool and add $\frac{1}{4}$ of a minum of 1:1000 solution of adrenalin chloride to each cubic centimeter.

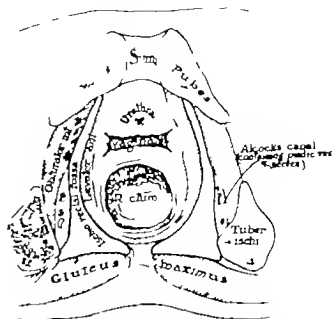


Fig. 4 Diagram illustrating the situation of Alcock's canal and the anterior projection of the ischio-rectal fossa.

2 Palpate the pubic arch to be sure of the landmarks.

3 Wash the site of each injection with alcohol or benzoin followed by the official tincture of iodine.

4 Spray each site lightly with ethyl chloride before entering the needle.

5 In the anterior triangle enter the needle 2 to 4 centimeter above the lower margin of the vagina and 2 centimeters from the ramus. Pass the needle to 4 centimeters in depth, corresponding to the level of the hymen or its remains and the expression of sudden pain as the needle meets the positive resistance of Colles' fascia will indicate the proper depth pass the needle through the fascia and inject the solution. In the anterior triangle use $1\frac{1}{2}$ cubic centimeters of the 2 per cent solution for each injection.

6 In the posterior triangle incline the needle laterally and enter it midway between the anus and tuberosities to a depth of 4 centimeters. In the posterior triangle use from 3 to 10 cubic centimeters of a 1 per cent solution in each injection. Varying as to the adiposity of the subject.

The injections are made bilaterally.

8 Primipara require only the anterior injection.

9 Multipara may require both anterior and posterior injections.

SUMMARY

1 No adverse results have followed nearly 100 injections. A slight superficial necrosis of the inner lips of the labium has followed the injection.

of stronger solutions of adrenalin but this in all cases cleared without harm

2. Anesthesia begins in a few minutes and is prolonged two to four hours

3. Lacerations are diminished in number and extent for the consciousness without pain of the patient allows retardation or advancement of the presenting part at will, thereby developing the fullest elasticity possible.

4. Hemorrhage from lacerations is greatly

diminished due to the adrenalin and lessened extent of tears.

5. Repair is greatly facilitated because of the duration of the anesthesia

6. Benzoin or alcohol and iodine sterilization of the obstetric area can be rapidly and painlessly carried out under this procedure when the posterior triangle is infiltrated.

The general practitioner can safely and easily apply this method at the bedside

AN OPERATION FOR BACKWARD AND DOWNWARD DISPLACEMENTS OF THE UTERUS

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THE operation described below has been performed fourteen times during the past twelve months and has given so uniformly good results in all these cases that the writer deems it worthy of report. The fourteen patients presented varying degrees of backward and downward displacements of the uterus from simple retroversion to complete prolapse. The ages ranged from 25 years to 64 years. In most of the cases repair of the pelvic outlet as well as attention to the cervix uteri was necessary. Where the cervix was badly lacerated, much en-

larged, or greatly elongated it was amputated by the circular method, which measure of course lightened the load markedly.

The abdomen is opened in the midline by a four inch incision the lower limit of which is about one and one half inches above the symphysis pubis. The skin and fat are pushed back from the edges for one half inch throughout the whole length of the incision and any work upon the adnexa or lower abdominal contents is carried out. Holding the edge of the rectus sheath taut

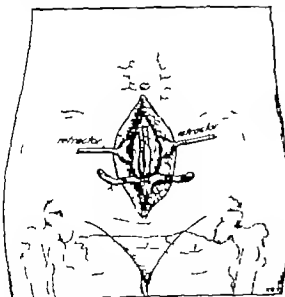


Fig. 1. First step. Two parallel strips A cut from the rectus sheath.

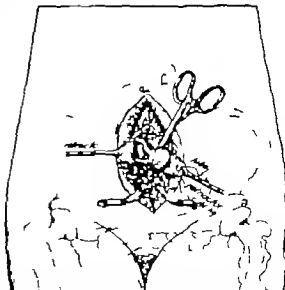
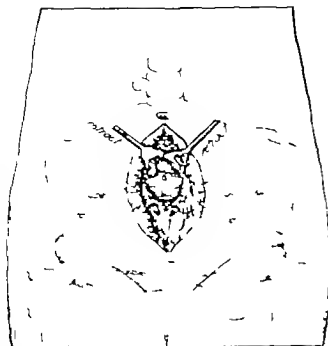
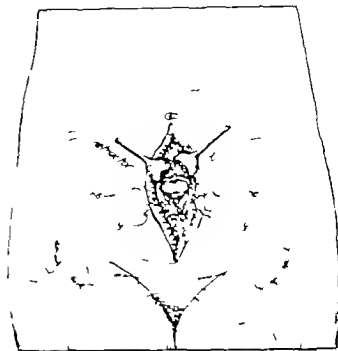


Fig. 2. Second step, showing forceps pushed through broad ligament just below round ligament, from behind forward and up through peritoneum, posterior rectus sheath and fibers of rectus muscle, ready to grasp end of strip.



117. Third step showing uterus in situ. The incision is made in the posterior surface of the uterus between uterine ends of the round ligament.



118. Fourth step in the operation. The strips are sewed in the incision and to each other.

a strip of this about one fourth of an inch wide is cut from the margin as long as the incision. The upper end is severed and the lower end is left attached. The uterus is next brought up high enough to make the posterior surface easily of access as low as the origin of the round ligaments and a shallow cut is made across this surface from the origin of one round ligament to the same point upon the other side. In making this cut the knife is held at an angle to the uterus of forty five degrees so that later on the incision may be completely closed. The uterus is then drawn to one side and held firmly while the next important step is taken. An eight inch hæmostat with jaws curved to a right angle with the blade is thrust from behind forward through the broad ligament on a level with the end of the incision on the posterior surface of the uterus and made to traverse the following structures in the order named: the parietal peritoneum and posterior rectus sheath the fibers of the rectus muscle. Thence it is made to emerge at the edge of the wound with ut having pierced the anterior sheath of the rectus and at or near the level of the lower end of the incision in this latter structure. The jaw of the hæmostat are then opened and the free end of the strip of the rectus sheath previously cut is grasped and the hæmostat is withdrawn until the jaws appear at the point where they entered i. e. at the end of the groove in the uterine wall just below the round

ligament. The same procedure is carried out upon the opposite side the ends of the strips are cut to proper length if too long and they are then sutured carefully to the bottom of the groove with twenty-day gut. The ends may be made to meet in the midline of the uterine wall or may overlap. The cut in the uterus is then sutured with one gut and one or two stitches are made to include the strip the round ligament and the broad ligament on either side. The uterus will then be seen to be in most excellent position hanging free and unattached to other structures and no raw surface for adhesions will be found other than the small area upon the two small strips of aponeurotic tissue which is almost negligible in amount.

The chief advantage claimed for this operation is that the new support is made of tissues which will not stretch out in a few months after active life has been resumed. Also the uterus is made one of two links of a chain which will hold the vaginal walls in place. Better anatomic position is secured and maintained than in many of the other varieties of operations for the relief of these conditions.

All patients so far have been completely relieved of the distressing symptom complained of prior to operation. It is therefore obvious that this method can only be used in patients past the menopause or in others where the tubes have been tied or other means of sterilization employed.

SPONTANEOUS EVOLUTION IN SHOULDER PRESENTATIONS

WITH REPORT OF A CASE

BY RALPH M. CARTER, A.B. M.D. GASTON BAY WISCONSIN

STEPHENSON in a recent article, states that spontaneous evolution in transverse presentations has been observed only twice in 13,000 consecutive labors at the Johns Hopkins hospital, and all authorities agree that it is a very unusual occurrence. On account of its rarity therefore, a report of the following case may be of interest.

On February 27, 1906 I was called to attend Mrs. K. living eleven miles in the country. I found a woman 34, five feet six inches in height and well developed. She informed me that she had passed through five previous labors, all normal and not particularly difficult. Pains in the present labor began about 5 p.m., and the bag of waters ruptured about 8 p.m., followed shortly by the prolapse of an arm. Hard pains then ceased, except for an occasional one. A midwife was in attendance, but with the prolapse of the arm, she rightly decided that the case was beyond her skill.

Under conditions as aseptic as possible considering the circumstances, I made an examination with light anesthesia, administered by the midwife. I found right scapulo-anterior with prolapse of the left arm which, as of good color. The cervix was fully dilated, and the uterus closely applied to the fetus in the condition of Killian passive contraction. The shoulder was firmly wedged into the pelvis, and it was impossible to get the hand into the uterus to perform version. Without using more force than I cared to employ under the circumstances, I absolutely no skilled assistance at hand. As the uterus was not markedly thinned, there were no hard pains, and the patient's general condition was excellent. I decided to move her to the hospital. She stood the trip in the aut. very well, arriving at the hospital at the end of the eleven miles drive in practically the same general condition as when left her home. She had few pains en route but they were not hard ones.

A few minutes after her arrival the pains increased markedly both in number and intensity and in short time, she was having violent bearing down pains at intervals of 1 or three minutes. She was placed immediately on the table, and light ether anesthesia administered. The prolapsed arm had now become very much swollen and congested, and the shoulder had rotated beneath the pubis. Almost without pause, spontaneous evolution by the method of Douglas took place. The chest, abdomen, and breech were consecutively forced over the perineum, followed by the legs and the other arm after which the head was extracted without difficulty. The placenta followed within five minutes.

The child was dead, but as shown by the changes occurring in the prolapsed arm, death had been very recent. It weighed six pounds, and was fully developed. The neck was markedly elongated.

The mother made an uneventful recovery and left the hospital on the eleventh day.

Transverse presentations are always pathologic. While the above case demonstrates that they

sometimes terminate spontaneously yet with very rare exceptions, the children all die and very frequently the mothers, if aid is not given. If left to Nature, several terminations are possible.

1. Spontaneous rectification may occur. This usually takes place during the last month, and is brought about by the contractions of pregnancy. It occasionally occurs during the early part of the first stage.

2. Spontaneous version may be brought about during the first stage of labor or rarely in the beginning of the second. The head or the breech may come to lie over the inlet, usually the former.

3. Spontaneous evolution may take place.

4. The pains continue, no advance is possible, the uterus ruptures, and the patient dies from hemorrhage or infection.

5. The pains may cease, the fetus be retained and become infected, decomposing and giving rise to a pyæmia, in which condition general sepsis and death usually follow.

Spontaneous evolution may take place according to one of three methods: (1) That of Roederer also known as *spontaneous expulsion* or *evolutio corporis conduplicato*. This is much rarer than ordinary spontaneous evolution, and requires a much roomier pelvis in proportion to the size of the fetus. The shoulder is forced down into the pelvis and the body is bent, bringing the head and thorax into apposition. Both the latter enter the pelvis together and emerge simultaneously from the vulva, following the birth of the shoulder. (2) The method of Douglas of which the above case is an illustration. In this method, which usually occurs in cases with prolapse of an arm the head is arrested above the inlet, the neck becomes very much elongated, and the chest, abdomen, and breech are forced out alongside the arm, followed by the legs, the other arm, and the head. (3) The method of Denman, which is the rarest of the three. This usually takes place in back posterior positions. The head rotates posteriorly the shoulder ascending simultaneously with the descent of the breech which finally comes down and out. A fourth method, or at least a hitherto undescribed modification of the method of

Douglas has recently been observed by Stephen son In his case, the left shoulder with pro-lapsed arm became fixed beneath the pubic arch as in Douglas method. Following this the but tocks emerged from the outlet with their anterior surface in contact with the inner surface of the arm This latter method must be extremely rare and the force required for it to take place is undoubtedly very great

The above-described mechanisms while they are very interesting in that they demonstrate the marvelous adaptability of the processes of Nature to unusual circumstances occur so rarely in practice that they should never be depended upon

For spontaneous evolution to occur we must have a roomy pelvis a small easily molded fetus and very strong pains It always occurs late in the second stage Once started however the rapidity with which the process is completed is astonishing a fact which has been remarked upon by several observers and illustrated in my own case From the onset of the severe pain to the birth of the placenta the time was fifteen minutes. The total duration of labor was eight hours.

Since it is practically impossible to predict in which cases evolution will take place and since

the results of neglected transverse presentations are so serious expectancy in the hope of evolu-tion has no place in the treatment of this class of cases If seen early in labor a short wait to see if spontaneous rectification or version will occur may be justified If neither of these takes place version should be performed as soon as conditions will permit Oftentimes deep anesthesia will allow turning where otherwise it appears im-possible Above all gentleness and care in all manipulations should be the first consideration and if the shoulder is deep in the pelvis the uterus contracted closely about the child and the latter does not turn easily attempts at version should be abandoned If the lower uterine seg-ment is greatly thinned version is contra-indicated as a rupture will almost surely occur In these cases decapitation should be performed In exceptional circumstances when the child is living the woman is in good condition and the surroundings favorable cesarean section may be considered

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BLOOD TRANSFUSION WITH PARAFFIN-COATED NEEDLES AND TUBES

By BETH VINCENT M.D. F.A.C.S. Boston

THE results obtained by the transfusion of blood are probably less dependent upon the particular method employed than upon any other factor pertaining to the subject The indications for a transfusion and the selection of the donor are more important than the technique of the operation. The therapeutic value of the blood is the same whether transferred by the citrate method as described by Weil¹ and Lewi-son² with the glass cylinders of Kimpton and Brown³ the pipet-cannula apparatus of Satterlee and Hooker⁴ or by the syringe method of Linde-man⁵ For this reason each surgeon should familiarize himself with the method which suits his own needs The following method has been

useful to me and may meet the requirements of other operators

For the past three years I have used a glass tube or flask with a paraffin coating which inhibits the coagulation of blood and allows ample time to transfer it from donor to recipient The tube resembles in principle and differs in shape from the cylinders described by Kimpton and Brown and the pipet of Satterlee and Hooker⁴ This method is easy and practical but requires a skin incision to expose the vein in both donor and recipient which is not necessary in many cases

Recently I have modified the tube so that it can be used with a needle of special design which obviates the skin incision on individuals with suitable veins After a year's experience with the needle and tube at the Massachusetts General Hospital and in my private work I find that this

Weil Richard J Am M Am 9 5, 1897 4 5
Lewison Surg Gynec & Obst 9 5, 1901, 27
Kimpton and Brown J Am M Am 9 5, 1901, 27
Satterlee and Hooker J Am M Am 9 6, 1902, 10
Lindeman Am J Obst N Y 913, 91, 8.

Satterlee and Hooker Surg Gynec. & Obst 14, 1904, 55

is the case with the donor at least, in a large percentage of transfusions.

The tube (as shown in Fig. 1) is a cylinder with a capacity of 300 cubic centimeters; the upper end of which is closed with a rubber cork. About 3 centimeters below the end is a side opening where connection is made with a bulb syringe which is used to express the contents of the tube. The lower end of the cylinder terminates in a glass tip through which the blood enters and leaves the tube. About 2 centimeters above the end of the tip is a ground glass joint by means of which a tight connection can be made with the needle.

The needle is 6 centimeters long and consists of a shaft and a socket of about equal length. The socket, which is the special feature of the needle, is made of an unusual depth so that there is no contact between the needle and that portion of the glass tip which projects into the socket below the ground glass joint. The needle is made in two sizes, number 14 and 16 gauge. I find that I use the larger size in most cases.

PREPARATION OF TUBE AND NEEDLE

The tubes are cleansed with hot water, wrapped in a towel with the cork and a short piece of rubber tubing and sterilized and dried in the autoclave. The process of coating the tubes with paraffin is then carried out under aseptic conditions. I have used 54 paraffin and various mixtures of stearin, paraffin and vaseline for coating but find that a commercial article sold under the name of "parowax" serves all practical purposes.

The paraffin which has been melted and sterilized in a metal dish is aspirated into the lower end of the tube and the outlets are covered with pads of gauze while the tube is turned to make the wax run over all the inner surface. The excess of paraffin is allowed to run out at the tip leaving a small amount in the tube to cover the cork when the tube is placed upon end to cool. This forms a disc of wax which makes the cork airtight, a condition which is essential to the proper use of the tube. As the tube cools a coating of paraffin appears on the inner surface. One should make sure that this covering is uniform and that the outlets are patent before the tubes are done up in sterile towels and put aside for future use.

The needles are cleansed, dried, and heated until sterile in a dish of melted paraffin. With sterile forceps a needle is then taken from the dish and the excess of wax is removed by shaking or by blowing air through the needle with a bulb syringe during the process of cooling to prevent the formation of a plug of wax in the lumen. The

needles are then sterile and coated and can be kept in a sterile box until needed.

This process of coating the tubes and needles requires some practice and is bothersome to the surgeon. It is one of the disadvantages of the method but the work can be delegated to any intelligent nurse. Prepared and put up in this way the needles and tubes may be kept indefinitely and are always ready for immediate use.

USE OF NEEDLE AND TUBE

The method of using the needle and tube varies with the case to be transfused and the experience of the operator. The tube should be used without the needle in cases in which the veins of both donor and recipient are small or hidden by a heavy layer of subcutaneous fat or when the surgeon lacks practice in vein-puncture and is unable to enter the vein without causing a hematoma. Under these circumstances it is advisable to expose and open the vein through a skin incision and insert the tip of the tube directly into the vein as described by Kimpton and Brown. The blood is usually taken from one of the larger veins in the donor's elbow while any vein in the arm or leg which will admit the glass tip can be used in transferring the blood to the recipient.

In most transfusions the veins of the donor are large and easy to puncture with the needle while the veins of an anemic recipient are apt to be small and hard to locate. For this reason it is usually advisable to take the blood from the donor into the tube by means of the needle, then disconnect the needle from the tube and inject the blood into the recipient through the glass tip which is inserted directly into a small vein previously exposed by skin incision.

Figure 2 shows the manner of using the needle and tube to take the blood from a vein at the donor's elbow. The arm is prepared with iodine and a small amount of novocain is injected into the skin over the selected vein which is made prominent by a tourniquet applied above the elbow. The application of the tourniquet is important. It should be placed directly on the skin and adjusted by the operator so as to secure the maximum venous tension without stopping the arterial flow. The needle is connected to the tube before making the puncture and inserted into the vein toward the wrist. As soon as the vein is entered the blood appears at the bottom of the tube and steadily rises to the top by virtue of the pressure in the vein. The rate of flow is increased if the donor works the fist during the procedure. When the tube is filled, which

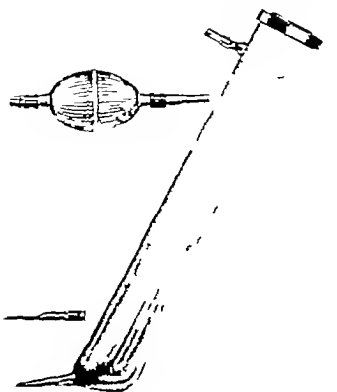


Fig. 2. Coated glass tube with needle and bulb.

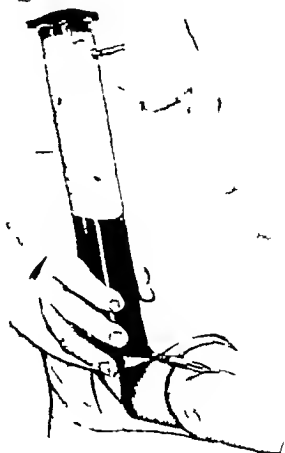


Fig. 3. Shows use of needle to take blood from vein at the elbow.

usually takes three or four minutes the flow is checked by releasing the tourniquet. This should be done before the needle is removed to avoid the formation of a hematoma. As the needle still attached to the tube is withdrawn pressure is made over the vein at the site of puncture. The needle is then disconnected from the tube and rinsed in cold salt solution. During this time the tube is kept in a horizontal position with the tip up to prevent the escape of blood. To complete the transfer place the finger over the upper opening of the tube to control the flow of blood depress the lower end and insert the tip into the vein of the recipient.

Figure 3 shows a tube half filled with blood which is being injected by this technique into the internal saphenous vein just above the ankle.

The average transfusion requires at least 600 cubic centimeters of blood. In most cases if a hematoma does not form around the vein it is possible to take two and sometimes three tubes of blood from the same vein by reinserting the needle through the original skin puncture. It is not necessary to use a fresh tube and needle for each transfer of blood. If cleaned immediately with cold salt solution they may be employed a second or even a third time in the same transfusion. A single tube and two needles usually

suffice for a transfusion although one should always be prepared with at least two coated tubes and extra needles.

The combination of needle puncture for the donor and incision for recipient is the practical method in most transfusion but under certain circumstances it is possible to use the needle on both the donor and the recipient. In such cases after the tube has been filled with blood from the donor as already described a needle is inserted into the median basilic or median cephalic vein of the recipient made prominent by a tourniquet above the elbow. As soon as a blood flow from the needle the tourniquet is loosened the tube filled with blood is connected with the needle and the content expressed by means of the syringe.

This needle and tube method without incision applies especially well to the infant with an open anterior fontanelle where the blood is injected into the superior longitudinal sinus as suggested by Helmholz.

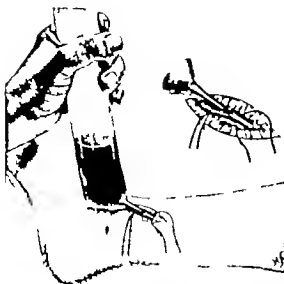


Fig. 3. Show technique of inserting glass tip int. vein which has been exposed and opened through skin incision. Position of tube to inject blood int. internal saphenous vein.

In my last seven cases of haemorrhagic disease of the newborn I have employed this method with very satisfactory results. The blood is taken by means of the needle from an elbow vein of the father who usually serves as the donor. One half a tube or 150 cubic centimeters of blood is sufficient as the amount required to transfuse these cases varies from 90 to 120 cubic centimeters. The infant is placed at the end of a table with the head on one side, as shown in Figure 4, and held firmly in this position by an assistant. The needle is inserted at the posterior angle of the anterior fontanelle exactly in line with the sagittal suture. The sinus is just beneath the skin and dura and large enough at this point to be located easily even in a newborn infant. As soon as the needle enters the sinus the fact is revealed by the flow of blood from the outer end. The needle is then held firmly in place while connection is made with the tube and the blood is slowly injected. The blood must be injected slowly to avoid a too rapid increase of intracranial pressure. In two of my cases this caused vomiting and disturbed respiration which corrected itself as soon as the flow of blood was

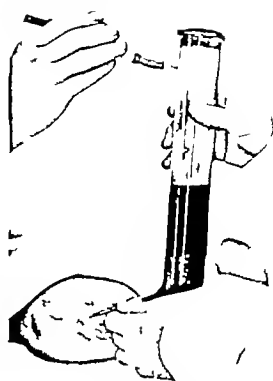


Fig. 4. Show position of infant head and point at which the injection of blood is made into the longitudinal sinus.

checked temporarily. Air pressure in the tube should be released by detaching the syringe before the needle is withdrawn. There is no bleeding of any amount from the sinus even if the puncture has been made with a fairly large needle.

The chief disadvantage of this method of transfusion lies in the preparation of the needles and tubes but this process is not difficult and may be done in advance. The coated needles and tubes can be kept indefinitely and are always ready for immediate use. In practice the method is certain and flexible. The combination of needle and tube allows the surgeon to make a choice of procedures to suit his own operative experience and the need of the individual case. The tube with open incision is a sure method for any transfusion and under favorable conditions the use of the needle with the tube materially simplifies the operation.

WIRING THROUGH THE OBTURATOR FORAMEN FOR SYMPHYSIS PUBIS SEPARATION

FOUR INCH SEPARATION OF THE SYMPHYSIS PUBIS PROTRUSION OF BLADDER BETWEEN THE SEPARATED BONES ANKYLOSIS OF THE SACRO-ILIAC JOINTS INVALIDISM FAILURE OF POSTURAL AND SUPPORTIVE MEASURES RESTORATION OF FEET BY WIRING THROUGH THE OBTURATOR FORAMEN

By SILVESTER J. McNAMARA, A.M. and F.A.C.S. BROOKLYN

SEPARATION of the symphysis pubis sufficient to cause invalidism is rare.

The history of the case is that of a woman 38 years old the mother of six children. The patient is of small stature and is inclined to be corpulent. She was attended by the same physician in all six confinements the last one being instrumental. She was not able to get around after the last confinement unless he supported herself on a chair which she pushed in front of her.

Some months after her last delivery she was taken with severe pains in her right side and was removed to the Kings County Hospital where she was operated on for acute gall bladder disease. When it was time to leave the bed it was found that she could not walk and on examination showed a separation of the symphysis pubis to the extent of four inches, with a fluctuating tumor between the separated bones which was found to be bladder.

Postural treatment and various devices were used but the patient complained so bitterly that they had to be discontinued. Compression by various appliances including support by plaster-of-Paris girdl taking one thigh was tried but with no success. At last a pigskin girdle reinforced with a shaped to her hips was put on and she was allowed to go home.

At no time were we able to bring the separated ends of the bones near enough together to hope for union even though we could find no device to hold them there.

Furthermore all attempt to bring the symphysis together caused the patient to cry out with the intense pain produced in the sacro-iliac joints. After a short time at home she returned to the hospital in about the same condition we first found her. After various consultations with my colleagues on the gynecological and obstetrical

services, as well as with the general and orthopedic surgeons, it was decided to bring the bones together by surgical means. The study of the symphysis in the dried specimen did not argue well for plating owing to the anclous nature of the bone irregularity of its surface and the nature of the strain. The obturator foramen presented one possible route for a safe and firm support.

A recentric incision about seven inches long was made exposing the space between the separated ends and the separated end of the joint was exposed mostly by blunt dissection. As the patient was in the elevated lithotomy position a catheter was placed in his bladder because of the unusual distention of the urethra and displacement of the bladder. The field of operation was enlarged by a longitudinal incision downward. An attempt was made here to bring the separated joint together by traction of the assistants making lateral pressure but without result.

The patient was turned on the side and one of the assistants with all his weight and strength and a jumpy jerky motion finally succeeded in breaking up the adhesions that had formed at the sacro-iliac joint and allowed the separated symphysis to come together.

The patient was replaced in the dorsal position, and with one finger behind the pelvic bone the obturator foramen was located on the patient's left. A long needle was passed on the finger followed by carrier and a No. 1 silver wire was carried over the right side and passed from within out and brought together in front and slowly twisted assisted at each twist by lateral compression. Particular attention was given to see that the bladder and urethra were not injured either by the compression or by the suture.

As the separated ends came closer and closer together the twisting of the wire became more difficult chiefly for two reasons: first the receding oblique surface of



Fig. 1. Four inch separation of symphysis pubis.



Fig. 2. Showing distortion of the sacro-iliac joint.



Fig. 3. Post-operative roentgenogram showing wire through the foramen and plate across the symphysis.

the symphysis and second the strain of the silver wire as evidenced by the great force necessary to twist it. The wire was twisted until the bones were in contact, the ends of the symphysis having been previously curetted.

Feeling that this single suture did not fulfill all the requirements for fixation of the pelvic girdle, two single Lane plates, one screw in each end, were placed across the symphysis, and the wound closed leaving small gutta-percha drain in each angle.

Convalescence was rapid and complete. Healing took place *per primam* throughout except at the site of one drain, which continued to discharge serous-sanguinolent fluid of small quantity which was later found to be due to small piece of the gutta-percha drain that became separated and kept up the irritation.

Eight weeks after the first operation, as the roentgenograms showed that the screw in the Lane plates had become dislodged, the plates were removed, perfect union followed, and the patient was allowed to sit up with supporting belt on.

It is now about 8 months since she had walked on, and it was necessary for the patient to learn again how to step. This was accomplished and she left the hospital walking very well on the level, but a little diffident on going up and down stairs.



Fig. 4. Roentgenogram showing result 6 months after operation.

It is now more than 10 months since the silver wire was inserted through the obturator foramen and up to this time it has given no sign of penetration there.

CONCLUSIONS

1. That inability to walk during the post-operative convalescence should call for an examination of the symphysis pubis.

2. That any separation of the pubic joint should call for a retention apparatus of suitable size and fitted to keep the separated bones in contact.

3. That in cases of unusual separation which are filling standing, the obturator foramen affords the safest and surest method of restoring the integrity of the pelvic girdle.

4. That in our hospital records no case has presented itself requiring operative procedure for separation, nor has any analogous case been found in surgical literature.

TRANSPLANTATION OF THE ABDUCTOR HALLUCIS TENDON IN THE SURGICAL TREATMENT FOR HALLUX VALGUS

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ANY operation for hallux valgus must have in view (1) the correction of the deformity, (2) the prevention of recurrence, (3) the preservation of the longitudinal arch.

The usual operation of the resection of the head of the metatarsal bone meets only the first requirement. To meet the second requirement

I devised and found feasible a transplantation of the tendon of the abductor hallucis from its usual insertion in the plantar surface of the base of the first phalanx to the periosteum covering the middle of the inner surface of the same bone. To meet the third requirement, I have confined the bone section to the exostoses, when possible,



Fig. 2 Showing bony projection *B* & *C* of excision

without resection of the head and follow this by suture of the capsule over the denuded bone area deep to the transplanted abductor tendon to prevent involvement of the transplanted tendon in the subsequent and inevitable callus.

The histories of a moderately large number of cases treated by this operation show that it will be rarely necessary to resect the head of the metatarsal bone.

After a thorough trial of the various operative methods this operation has given me the best results. The simplicity, ease and safety with which it can be performed in my opinion warrant its trial in these cases. It allows the patient to walk well and absolutely without pain; the great toe remains in perfect position and is naturally mobile and it does not affect the weight bearing function of the foot.

TECHNIQUE

The steps of the operation are as follows:

1. Under general anesthesia forcibly move the great toe in all directions stretching the contracted tissues.

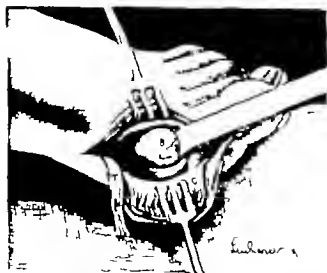


Fig. 3 *B* Bony projection *T* tendon of abductor hallucis *C* capsule.



Fig. 4 *C* Capsule *T* tendon of abductor hallucis to be transplanted

2. Paint the foot and toes with iodine.

3. Make a slightly curved incision about two inches long beginning one half inch in front of the bony prominence on the inner side of the great toe. A semicircular flap of skin and subcutaneous tissue is dissected free from the bursa and turned down over the joint so that the subsequent scar will not be at a point of pressure (Fig. 1).

4. The soft parts are retracted. The tendon of the abductor hallucis is now seen under the head of the metatarsal bone and is dissected free from its attachment to the base of the first phalanx (Fig. 2).

5. A flap is now made including the bursa, capsular ligament and periosteum and turned down exposing the bony deformity to view (Fig. 3).

6. Apply the chisel to the bone at the junction of the condyle and globular head of the meta-



Fig. 4. *T* Tendon transplanted and sutured *C* capsule sutured.

tumal and excise the hypertrophied bony projection longitudinally backward (Fig. 3)

7. Irrigate the wound with hot saline solution.

8. Replace the capsule to cover the raw surface of the bone and fix it with catgut sutures.

9. The tendon of the abductor hallucis is now transplanted to the middle of the inner surface of the first phalanx, and sutured with fine silk or Pagenstecher thread, to the periosteum (Fig. 4)

10. Close skin in usual manner

11. A plaster-of Paris bandage is applied to the foot and toe holding the toe in a slightly overcorrected position and allowed to remain for a week or ten days

AFTER TREATMENT

If the patient carefully observes in strictness as to the wearing of properly shaped shoes, no further post-operative treatment will be necessary

APPARATUS FOR USE AFTER HARE-LIP OPERATIONS

By HERBERT L. SMITH, M.D., NASHUA, N.H., HAMPSHIRE

FOR many years I have used a device made of brass spring wire to take the strain from the sutures after hare lip operation. The wire is bent into a shape something like a broad wishbone, the end of each arm pushing the cheek and lip toward the median line. Ordinary corn plasters are fixed to the loops of the wire. These will adhere to the skin for ten days or more.

Although I use deep tension sutures of silk on

the inside of the lip it is chiefly the wire spring which holds the edges in position. The mucous membrane is sutured with catgut and the skin with horsehair. The method of application is shown in the illustrations. In this case the apparatus was made of No. 10 wire. In older children a larger size has sometimes been used. The accompanying picture was taken a week after operation.



Fig. Device made to keep the strain from sutures after hare-lip operations.



Fig. Patient one week after operation showing device in position

AN IMPROVED SUBSTITUTE FOR IODIZED CATGUT SUTURES

II BACTERIOLOGICAL TESTS

BY CASSIUS H. WATSON, B.S., M.D., BR. KLAN

In a previous communication (1) the author reported certain experiments which demonstrated that a double salt of iodine—potassium mercuric iodide—possessed marked advantages over iodine for the impregnation of catgut sutures. Briefly, the results were as follows:

1. Potassium mercuric iodide in water and alcoholic solutions possesses more than ten times the germicidal efficiency of iodine.

2. Sutures impregnated with this double salt have a tensile strength 6.5 per cent greater than plain sutures and 16.5 per cent greater than iodized sutures.

3. Sutures impregnated with the double salt when sealed in tubes containing a suitable storing medium show no deterioration when the tubes are subjected to boiling water.

The substitution of potassium mercuric iodide for iodine seemed to constitute such a distinct improvement in the preparation of antiseptic sutures that it was deemed desirable to develop a method for thus impregnating suture materials and then to subject such products to exhaustive bacteriological tests. The experiments reported below were planned to determine—

1. The efficacy of the procedure in producing sterile sutures and

2. The degree of antiseptic or germicidal powers imparted to such sutures by their impregnation with potassium mercuric iodide.

To this end therefore raw dehydrated catgut sutures were treated with an alcoholic solution of this salt placed in tubes with various storing fluids and the tubes sealed. Heat sterilization was omitted in order to make the conditions of the test more exacting. All tests were controlled with samples of plain chromic and iodized catgut from several reliable manufacturers.

I. SUTURES TESTED

- | | | |
|-------------------------------|--|-------|
| A Plain catgut No. 3 | impregnated with potassium mercuric iodide | Batch |
| B Plain catgut No. 3 | impregnated with potassium mercuric iodide | Batch |
| A 20-day chromic No. 3 | impregnated with potassium mercuric iodide | Batch |
| B 20-day chromic No. 3 | impregnated with potassium mercuric iodide | Batch |
| 3 Iodized catgut No. 3 | Manufacturer A | |
| 4 Iodized catgut No. 3 | cold process. Manufacturer A | |
| 5 3-day chromic catgut No. 3 | Iodized. Manufacturer B | |
| 6 20-day chromic catgut No. 3 | Iodized. Manufacturer B | |

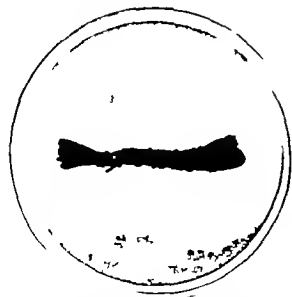


Fig. Catgut sutures impregnated with potassium mercuric iodide imbedded in agar infected with typhoid bacilli. No growth of the bacilli.

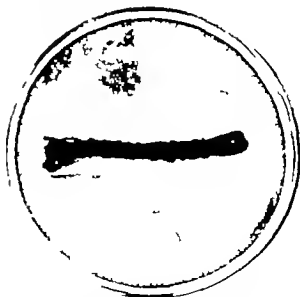


Fig. Iodized catgut sutures imbedded in the same medium. Growth of the bacilli.

7	so-day chronic catgut No. 1	Iodized. Man
8	Iodized catgut No. 1	factor B
9	Iodized catgut No. 2	Manufacturer C.
10	Iodized catgut No. 2	Manufacturer D.
11	Iodized catgut No. 2	Manufacturer E.
12	Iodized catgut No. 2	Manufacturer F.
13	Iodized catgut No. 2	Manufacturer G.
14	Iodized catgut No. 2	Manufacturer H.
15	Iodized catgut No. 2	Manufacturer I.
16	Iodized catgut No. 2	Manufacturer J.
17	Iodized catgut No. 2	Manufacturer K.
18	Iodized catgut No. 2	Manufacturer L.
19	Iodized catgut No. 2	Manufacturer M.

II. STERILITY TESTS

Experiment Technique. The tubes containing the sutures were immersed for one hour in warm bichloride of mercury solution (.001) drained free from the solution, broken the suture removed with sterile forceps, washed quickly and thoroughly in 100 ccm sterile water the adherent water roughly removed by draining the suture against the inner surface of the container and then immediately placed in tubes containing 75 ccm of nutrient broth. Duplicates were placed in similar tubes of broth covered with a thick layer of sterile liquid paraffin to insure anaerobic conditions. All tubes were incubated for seven days at 37°C. At the end of that time, if no visible growth had appeared, as further control agar slant were inoculated with portions of the broth in which the suture had been incubated. Twelve tubes each of lots and were tested.

Result. All tubes showed absence of growth, and sub-inoculation of the broth on agar proved their sterility.

Experiment. Sutures of both plain and chronic catgut impregnated with potassium mercuric iodide are not tubed, but instead were preserved in paper envelopes. They were subjected to no heat sterilization, and further no preps. clones were taken in handling them to prevent bacterial contamination. Twelve sutures were tested as in Experiment.

Result. All remained sterile.

Experiment 3. I order to determine whether the absence of growth in the broth in Experiments 1 and 2 was due to the actual sterility of the sutures or to the inhibiting action of the impregnating substances on bacteria already in the gut the strands from ten of each of the incubated broth tubes of sutures and were removed under aseptic precautions, washed again in water and planted in fresh tubes containing 75 ccm. of broth.

Result. In no case was there growth.

The outcome of Experiments 1, 2 and 3 would seem to attest the efficiency of the method for insuring the complete sterilization of the suture materials.

III. COMPARATIVE BACTERIOSTATIC EFFICACY OF SUTURES IMPREGNATED WITH IODINE AND WITH POTASSIUM MERCURIC IODIDE

Experiment 4. Twelve tubes from lots A and B and A and B and four tubes each of all the other lots were first tested for sterility by the method described above. After seven days incubation all were found to be sterile.

To each tube was then added 1 ccm. of 24 hour broth culture of virulent and actively growing strain of staphylococcus pyogenes aureus. Table I shows the result after further incubation of seven days.

TABLE I.

Lot	Tubes											
	1	2	3	4	5	6	7	8	9	10	11	12
1A	O	O	O	O	O	O	O	O	O	O	O	O
1B	O	O	O	O	O	O	O	O	O	O	O	O
2A	O	O	O	O	O	O	O	O	O	O	O	O
2B	O	O	O	O	O	O	O	O	O	O	O	O
3	G	G	G	G	G	G	G	G	G	G	G	G
4	G	G	G	G	G	G	G	G	G	G	G	G
5	G	G	G	G	G	G	G	G	G	G	G	G
6	G	G	G	G	G	G	G	G	G	G	G	G
7	G	G	G	G	G	G	G	G	G	G	G	G
8	G	G	G	G	G	G	G	G	G	G	G	G
9	C	C	C	C	C	C	C	C	C	C	C	C
10	G	G	G	G	G	G	G	G	G	G	G	G
11	G	G	G	G	G	G	G	G	G	G	G	G
12	G	G	G	G	G	G	G	G	G	G	G	G
13	G	G	G	G	G	G	G	G	G	G	G	G
14	G	G	G	G	G	G	G	G	G	G	G	G
15	G	G	G	G	G	G	G	G	G	G	G	G
16	G	G	G	G	G	G	G	G	G	G	G	G
17	G	G	G	G	G	G	G	G	G	G	G	G
18	C	C	C	C	C	C	C	C	C	C	C	C

O No growth G Growth

Experiment 5. T test further the inhibiting action exhibited by all the sutures of lots A and B and A and B and of two sutures of lot 9 and one suture of lot 8 the broth tubes containing these particular sutures were then inoculated with 5 mm. loopful of 48-hour pellicle of pure culture of bacillus subtilis. The result may be thus tabulated.

TABLE II

Lot	Tubes											
	1	2	3	4	5	6	7	8	9	10	11	12
A	O	O	O	O	O	O	O	O	O	O	O	O
B	O	O	O	O	O	O	O	O	O	O	O	O
1A	O	O	O	O	O	O	O	O	O	O	O	O
1B	O	O	O	O	O	O	O	O	O	O	O	O
2	G	G	G	G	G	G	G	G	G	G	G	G
3	G	G	G	G	G	G	G	G	G	G	G	G
4	G	G	G	G	G	G	G	G	G	G	G	G
5	G	G	G	G	G	G	G	G	G	G	G	G
6	G	G	G	G	G	G	G	G	G	G	G	G
7	G	G	G	G	G	G	G	G	G	G	G	G
8	G	G	G	G	G	G	G	G	G	G	G	G

In none of the tubes containing sutures A and B and 1A and B was there growth, while only one tube of lot 9 showed freedom from infection. The inhibiting power of the sutures impregnated with potassium mercuric iodide was marked.

Experiment 6. I order to determine whether the inhibition of growth in the tubes containing sutures A and B was due to an antiseptic or germicidal action the following test was made.

From 12 tubes each of lots A and B and 1A and 1B which had been inoculated with staphylococcus from 24 tubes each of lots 1A and B and A and B inoculated with bacillus subtilis, and from one tube of lot 9 all 12 which had shown no growth on incubation (Experiments 4 and 5) 5 and 10 ccm. of the broth as pipetted in 75 ccm. of fresh broth. The purpose was to dilute the possible content of impregnating substance dissolved from the suture in the first broth tube and by this dilution to do away with any purely inhibiting action. If growth occurred, it could then show that the suture possessed merely antiseptic properties while, if no growth occurred

it would indicate that the catgut contained a sufficient amount of the impregnating substance not only to inhibit but actually to kill the organisms. The result is shown in Table III.

TABLE III

Lot	TO INHIBIT									
	Staphylococcus					B. subtilis				
	1	2	3	4	5	6	7	8	9	10
1A	0	0	0	0	0	0	0	0	0	0
1B	0	0	0	0	0	0	0	0	0	0
2A	0	0	0	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

1. *permeant* sutures of lot 1 and 2 were washed sterile with distilled water in deep petri dishes the covered with sterilized agar which had been inoculated with staphylococcus aureus and the plates incubated.

It was felt that such an experiment would in the first place approximate *in vitro* the conditions existing about a suture planted in human tissues further it would demonstrate to what degree impregnating substances diffuse through such a medium and to what extent an antiseptic or germicidal zone is thus created.

Figures 1 and 2 show in a striking way the marked inhibitory power of catgut impregnated with potassium mercuric iodide as compared with iodized catgut. The lighter areas about the imbedded sutures represent zones of no bacterial growth while the darker portions in the plates are masses of staphylococcus colonies. It should further be remembered as has been shown in Experiment 6 that in the case of the former sutures the inhibiting action is truly germicidal while in the case of iodized sutures the action at most is only antiseptic. It seems particularly significant that the potassium mercuric iodide can diffuse and exert an inhibitory action to such an extent through a medium as dense as agar. Iodine on the other hand has only a slight diffusibility.

If this experiment can be considered as a criterion of the conditions obtaining about a suture

imbedded in human tissues it is evident that catgut sutures impregnated with potassium mercuric iodide protect the tissues against bacterial infection to a much greater degree than do the usual iodized sutures.

DISCUSSION

Experiments 1 and 2 demonstrate that the process of impregnating catgut sutures with potassium mercuric iodide renders them sterile and the efficacy of the method is attested by Experiment 3 which shows that even when such sutures are preserved and handled with entire neglect of aseptic precautions they remain sterile. In Experiments 3, 4 and 5 the results prove that sutures impregnated with potassium mercuric iodide have sufficient inhibitory power to prevent the growth of staphylococcus pyogenes aureus and even of the sporulating bacillus subtilis while the ordinary iodized sutures have little or no such action (one suture out of 64 inhibited both the staphylococcus and bacillus subtilis but failed to kill them). Experiment 6 shows further that this inhibiting action of potassium mercuric iodide is not merely bacteriostatic but is truly germicidal.

CONCLUSIONS

1. Potassium mercuric iodide is an improvement over iodine for the impregnation of suture materials in so far as their physical properties are concerned (1).
2. Sutures impregnated with potassium mercuric iodide possess a decidedly greater inhibiting power on the growth of bacteria than do sutures impregnated in the usual way with iodine.
3. The inhibiting action of potassium mercuric iodide sutures is a germicidal one.

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TRANSACTIONS OF SOCIETIES

CHICAGO GYNECOLOGICAL SOCIETY

REGULAR MEETING HELD FRIDAY EVENING, APRIL 21 1916 WITH THE PRESIDENT
DR. CHANNING W. BARRETT IN THE CHAIR

EXTERNAL INCOMPLETE RUPTURE OF THE UTERUS FOLLOWING SUBPERITONEAL HEMORRHAGE

Dr. A. J. WIGGAM (Augustana Hospital, service of
Dr. R. W. Holmes)

On February 7 1906 at 1:15 p.m. Mrs. A. H. was admitted to Augustana Hospital in labor. The patient was married, 38 years of age, mother of six children, the oldest being 6 years and youngest 4½ years. Each birth had been normal and easy. Labor was due February 17 1916 as the patient had menstruated last on May 19 1915. The patient did not know when she conceived or when life was felt. From the history obtained it would seem she had had no trouble during the pregnancy. On February 6 at 3 p.m. the patient went into labor. At 3:30 a.m. the following morning physician was called and found the head floating membranes intact, and slight amount of dilatation. At 2:30 p.m. the same day the head was fixed, with complete dilatation, and the membranes intact which were then ruptured artificially. At 5 o'clock the occiput was to the right and the head low. Without anæsthesia forceps were attempted several times, but without success in locking the instrument. As the patient had not been prepared on admission to the hospital she was taken care of at the hospital by the nurse in the delivery room. The patient was catheterized, but only a few drops of bloody urine was obtained. Labor was strong and the pulse was 114 at 10:45 p.m. after the preparation was completed. Five minims of pituitrin was given hypodermatically and contractility became active. Diastals of recti muscles was very marked. At 10:50 the pulse was 132. Five minims more of pituitrin was given hypodermatically and at 11:05 o'clock a female child weighing 8 pounds 13 ounces was born spontaneously. At 11:10 the placenta was expressed by Crede.

At 11:20 the patient had a pulse of 40 and respiration of 32, and was fairly comfortable. Sometime after midnight she vomited a large amount of yellow fluid. Proctodials of 500 cubic centimeters of normal salt-solution was given at 2 a.m. and again at 6 a.m. and all was absorbed. The patient did very well and at 5:3 p.m. the first day of the puerperium (February 28) the patient was given an ounce of oleum ricini on account of dyspepsia

from excessive tympany and an enema the following morning with good results. At 8 p.m. the first day of the puerperium (February 28) the patient was catheterized. As the patient had voided 4 ounces at 10:30 a.m. the catheterized urine was cloudy specific gravity 102. It was acid, albumin was present 1 gram per liter leucocytes 1 hyaline casts, granular casts and some amorphous urates were found.

On the second day of the puerperium (February 29) at 4 p.m. the patient had a temperature of 100 pulse of 88 and respirations of 20 no chest findings. There was considerable tympany but the patient stated that she always had this with each puerperal period and that she usually got relief with oleum ricini. From that time on patient had fever involuntary bowel-movement and was not doing well. About midnight (March 1) the patient vomited a great deal of coffee-ground fluid, but after gastric lavage she felt quite comfortable. The following morning she complained of severe abdominal pains and omitted great deal of clear fluid. The temperature was 100 pulse 40 thready weak, and of poor volume. Respirations were 24. At 4 p.m. the fourth day of the puerperium (March 2) the temperature was 104 pulse 140 respirations 36 and there were involuntary bowel-movements. During the afternoon of March 3 and morning of March 4, the patient had involuntary urination but was quite comfortable. Temperature 100 pulse 40 and respirations 38 at 4 a.m.

About 8 a.m. on the fourth day of March, the fifth day of the puerperium, the patient suddenly collapsed, the pulse became thready and weak and of low volume, recorded as 60 at 8:50 vomited coffee-ground material, became pulseless, and died at 9:35 that morning.

Post-mortem examination of her pelvic viscera was permitted and this was performed by Dr. Karl Lewis. The abdomen was distended, and on opening the peritoneum, an almost explosive gush of blood escaped from the incision, running over onto the floor. Few fresh adhesions were present. The uterus was hardly involuted. The peritoneum separated from the uterus from within the left broad ligament across the anterior wall almost to right broad ligament. The bladder was separated to the vaginal attachments. In the uterine wall under

the left broad ligament an incomplete external rupture was found. This was probably due to a rupture of an intramural blood vessel with a development of a subperitoneal hematoma, which when dissected separated the loosely adherent peritoneum of the anterior uterine wall and the bladder and ruptured enteroabdominally on the fifth day of the puerperium.

The baby was born with asphyxia pallida and was revived with difficulty. The child did not breathe well for 10 to 15 minutes and oxygen was administered. The following morning it died respirations becoming slower and slower. The child had several convulsions.

Dr. RUDOLPH W. HOLMES. On admission this patient was exceedingly tympanitic, which continued until her death. She stated she always had this tympany with each puerperium. The question arose had the uterus been bruised by the forceps attempts was the injury due to prolonged pressure of the lower segment against the pelvic brim or was it due to stretching of the lower segment that is a threatened rupture of the uterus. On account of the tympany this could not be determined. In a cursory review of the literature I find the report of a case in the service of the Boston Lying in Hospital some ten years back which presented a rupture of a sinus posteriorly in the lower segment. The patient died of an intraperitoneal hemorrhage. We know that vessels rupture occasionally into the broad ligament producing a broad ligament hematoma.

A MEMBER. When do you think the rupture occurred?

Dr. HOLMES. Unquestionably during labor or at least shortly post partum. Unquestionably an interstitial intramural hematoma formed within the cavity found in the uterine wall under the anterior fold of the left broad ligament. Later under the influence of the mild peritonitis and metritis, the wall broke externally after an extensive dissecting hematoma had raised the loosely adherent peritoneum and bladder and on the fifth day the peritoneum ruptured. It may not be questioned that the hematomatous sac ruptured at 8:30 a. m. when her collapse came.

A MEMBER. How do you account for the blood which was present in the bladder when she entered the hospital?

Dr. HOLMES. Hematuria is not infrequently found in labor especially obstructed labor due to pressure congestion with minute apoplexies of the vesical mucous membrane and rupture.

A MEMBER. Was the bladder separated from the uterus?

Dr. HOLMES. From the appearance of the specimen the primary rupture occurred at the left broad ligament at which point there was a distinct cavity which almost extended down to the uterine mucosa. The loosely adherent peritoneum of the anterior uterine surface was stripped off from the left to the right broad ligament. Likewise the entire bladder

was separated from the uterus down to the attachment to the vagina. It was as completely accomplished as it would have been in a total hysterectomy.

PERITHELIOMA AND ENDOTHELIOMA OF THE UTERUS

Dr. W. A. Newman Dorland read a paper entitled Perithelioma and Endothelioma of the Uterus.

A CRITICAL REVIEW OF THE LITERATURE PERTAINING TO THE RELATION BETWEEN GYNECOLOGY AND NEUROLOGY

Dr. Richard R. Smith, Grand Rapids, Michigan, read a paper entitled A Critical Review of the Literature Pertaining to the Relation between Gynecology and Neurology.

THE LEUCOCYTES IN PREGNANCY, LABOR AND THE PUERPERIUM

Dr. JOSEPH L. BAER read a paper (by invitation) entitled The Leucocytes in Pregnancy, Labor and Puerperium. (See p. 597)

DISCUSSION

Dr. CHARLES S. BACON. I think the tables given will be very interesting for study when one can look them over a little more carefully than has been possible here.

I have been in the habit of making a routine count generally on the first or second day after labor simply for the purpose of comparing that with a subsequent count that would be made in case of any rise in temperature. We have found always a rather high leucocytosis, about agreeing with that given in the tables tonight. The difference in the reports of various authors have been so great that I had about given up any hope of making any use of the leucocyte count in general in determining the prognosis of the case in any respect whatever. I regard this as the best collection of cases certainly the best work that I know anything about and I believe that we will make use of it in the future.

Dr. GILBERT FITZ PATRICK. In order to check up some of these findings we carried on some investigations in our own clinic. We made use of Bier's pump during lactation and after having used the pump on several occasions in comparing the count we found where the pump had been used rhythmically at nursing and then making a count shortly afterward there was a slight tendency toward an increase of the lymphocytes.

A CONTRIBUTION TO THE ETIOLOGICAL STUDY OF OVARIITIS

Dr. CARL HENRY DAVIS (by invitation) read a paper on A Contribution to the Etiological Study of Ovaritis. (See p. 560)

DISCUSSION

DR. C. S. BACON Without attempting to discuss this paper I would like to ask one or two questions. I understood that the author assumed that fibrocystic degeneration and ovaritis are synonymous terms. I do not know exactly why I understand that it is assumed that bacteria cause the fibrocystic degeneration. I do not know why. To prove that ovarian infection must be hematogenous two cases were given where there was no connection between the vagina and the ovary. In one of those cases, however, there had been an abdominal operation with drainage, and of course that would furnish a mode of entrance for the bacteria into the ovary. In the other case there was no such possibility but I suppose there was the possibility of an infection by the lymphatic route.

Although these objections do not by any means show that there is not a hematogenous infection of the ovary and I suppose all must admit its possibility still in the establishment of a positive pathogenesis and carrying it so far as to suggest the treatment of local infections as local foci for the prevention and cure of infection in other parts of the body it is necessary or desirable at least to absolutely eliminate other methods of infection.

DR. N. SPROAT HEARNEY Experience shows that a blood borne infection can cause pelvic inflammation, as witness the occasional suppurations with bacillus typhosus of ovarian cysts in the course of typhoid fever. I have had one ordinary pelvic abscess which developed during a typhoid fever and yielded the bacillus typhosus in pure culture. Dr. Davis cases with blocking of the lower passages through malformations of development and chronic inflammatory changes in the absence of a history of acute disease absolutely show that also chronic pelvic lesions may result from infection brought through the blood stream. Now, since other departments of medicine and surgery through the work instituted by Rosenow show daily convincing evidences of the production of chronic inflammatory processes in various organs as a result of a chronic distant focus it does not seem strange to me that the same may be true of the pelvis as is true of other fields.

It may be a question as to whether this work of Dr. Davis is conclusive in this particular point that chronic cystic disease of the ovaries results from blood borne streptococcus viridans infection from distant foci.

DR. MARK GOLDSTEIN What has always puzzled me in a case of chronic ovaritis where one opens the abdomen and finds both ovaries affected is which one of the ovaries will be sterile, which one will give trouble later on, and which one is infected by the streptococcus viridans? If we leave the ovary the patient comes back with symptoms worse than the symptoms of the artificial menopause because she has had severe operation and still has the pain complained of before the operation and still which has been operated upon and has not been cured if her symptoms is not satisfied.

I would like to have Dr. Davis explain how we can tell when both ovaries seem diseased, which one is sterile and which is not.

DR. DAVIS (closing the discussion)

While the possibility of a lymphatic infection in these cases has not been taken into consideration the experimental work which has been carried out and which you can read in the *Journal of the American Medical Association* April 15, 1906 I think gives pretty strong evidence of the hematogenous origin. So far as telling which ovary to leave and which one to take out I do not know any more about how to choose between them now than I did two or three years ago. I have studied and gone over carefully the symptoms which are given by the patient. I studied the pathological findings as recorded by the operator. I have studied the ovaries as seen under the microscope and I do not know anything more about how to choose between them now than I did three or four years ago. So that when I am operating on a case I keep in mind and have the nurse read to me the carefully recorded history of the symptoms and if I find two ovaries with apparently not much choice between them, in a young woman, and her pain has all been on the right side, I make it a practice to leave the left ovary. If her pain has been on the left side I make it a practice to leave the right ovary.

CORRESPONDENCE

To the Editor I find that through an error in copying the manuscript for Dr. Murphy's article on "Bone and Joint Disease in Relation to Typhoid Fever" which appears in the August issue of *SURGERY GYNECOLOGY AND OBSTETRICS*, credit was not given to D. Charles M. Jacobs for certain paragraphs taken from his excellent article "Spontaneous Luxation of the Hip-Joint as a Sequel of Typhoid Fever," which was published in the April 10, 4 issue of the *American Journal of Orthopedic Surgery*. We greatly regret this unfortunate error and wish to say that it was an unintentional oversight that Dr. Jacobs' name was omitted.

D. MATTHEIAS, Secretary to the late Dr. Murphy

A CRITIQUE OF NEW BOOKS IN SURGERY

By MAJOR G. SEELIG, M.D., St. Louis

FOR several months past there have appeared comparatively few books devoted to the technical side of surgery. Recently, by contrast, the technical side has been emphasized again, and this month we have three volumes devoted almost unqualifiedly to the Simon pure art side of surgery. Of course a coincidence of this sort—and it is a mere coincidence—calls for no comment. The activities of men as individuals and as groups always show a tendency to manifest themselves in waves. There is this of interest, however, in the three volumes under consideration, namely, that each embraces a different field of technique, thus driving home the lesson that even the so-called carpentry side of surgery demands for its mastery a fairly wide acquaintance with an ever broadening field of activity, a field broadening with such rapidity and such inevitableness that specialization is being forced upon us willy nilly, not only by the demands of an academic grasp of fundamentals, but also by the requirements of specialized technical procedures. We shall probably revert to this later in the review. For the time being it is only necessary to point out that one of the three books is a hardy perennial on general technique—an operative surgery written by a master and appearing now in its seventh edition, another deals solely with the technique of the administration of anesthetics, and finally the last one is devoted to technical procedures on the upper air passages.

As a whole, the three treatises are clear, cut, concise, and admirably specific both in their purpose and in the way they set about to accomplish it. This is saying much, for as a rule the average description of a simple operative procedure is milky maddening. I have often thought that much of the travel side of surgery—the peripatetic meanderings to the clinics of other men—owes its origin to the fact that the descriptive art of surgical writing is so feebly developed. Men want to see for themselves that which the cold and unresponsive printed page fails to drive into their consciousness. In furnishing a tentative explanation of these surgical wanderings I am of course not deprecating them for they are truly among the best things in the life of a surgeon. The point is that men find difficulty in describing a complicated act on paper. The following quotation, selected from the writings of a humorist, is appropos and illustrates the point to perfection. A friend writes to the humorist

inquiring how to tie a bow tie, and receives the following answer: "You hold the tie in your left hand and the collar in the other. Slip your neck in the collar and cross the left hand end of the tie over the right with the left hand, steadying the right end with the other hand. Then drop both hands, catching the left with the right and the other with the other. Reverse hands and pick up the loose ends with the nearest hand. Pull this end through the loop with your unengaged hand and squeeze. You will find the knot all tied and all you have to do is to untangle your hands."

WHEN one finds himself face to face with a heavy tome like this seventh edition of Binnie's classical work, he covertly prays for the gift of condensation. Very recently a critic demonstrated this gift by reviewing Binnie's *Operative Surgery* in remarkably small compass, driving home his opinion in the following short introductory sentence: "In the dozen years Binnie's *Operative Surgery* has been before the profession it has grown steadily in size and importance until it has become as nearly indispensable a reference work as such a book can be." An affirmative and well intoned Amen to the above expression of opinion would constitute an adequate book review in this instance for those who know their Binnie demand no critique and those who do not know him ought surely to have acquaintanceship forced upon them by the information that he is indispensable.

Convention demands, however, more than a recommendation to purchase. It therefore becomes necessary to point out that the seventh edition, like its predecessor, appears in one volume form—bulky and full but manageable with perfect comfort. In common with all the previous editions, this one sets up as its aim the constant endeavor to give aid to the surgeon when he is in trouble. One fact alone furnishes assurance that the aim has been accurate, and that fact is the large number of men who in past years have expressed their dependence upon this book.

The general management of the parts remains as heretofore. There are evidences scattered throughout the whole volume of emendations and deletions and there is a notable addition of quite a number

NEW ALLOW OPERATIVE SURGERY By JOHN FAIRBANK Binnie, A.M.
C.M. F.A.C.S. 7th ed., revised and enlarged. Philadelphia: P.
Blakiston, Son & Co., 1916.

of new cuts that illustrate the text admirably. Several of these cuts are from remarkably recent current literature. In all, three new chapters have been added: one on cardiac surgery, a short one of nearly three pages on retroperitoneal neoplasms, and an appendix on war surgery written by Dr. Walter S. Sutton. This chapter by Dr. Sutton, although it is particularly well done considering the exigency of space, seems to mirror the tendency of the times rather than to possess any large inherent surgical value. This opinion, however, may be faulty owing to the fact that supersaturated as we all are with surgical war reports written in *extenso* we are very apt to sniff at a résumé of thirty pages.

There is practically nothing of consequence in the field of operative surgery that one cannot find in this volume. Furthermore, when he finds it, it is described, without exception, in the most unmistakable fashion. There are no bow tie fassions lying around loose. If one were forced to point out defects he could only mention several bits of evidence of careless proof-reading, and possibly suggest that Dr. Binns, for safety's sake, should point out more clearly the dangers inherent in the various proposed methods of curing hydrocele by the injection of iodine carbolic acid, and other irritant chemicals. In a book of this sort more space ought not to be devoted to insinuating caution than to describing methods of introducing potential agents of gangrene into closed cavities.

But after all has been said the final fact remains that the book comes about as near being a surgical bible as anything non-biblical can.

THIS next book limits itself to the technique of anesthesia. Practically everyone who will first read the preface carefully and then go through the text, will reach the conclusion that this volume is in a class by itself. It has been said by someone that good writing depends most largely upon proper thinking. Here is a book that seems to have been thought out well in advance of writing it. There is definiteness of arrangement, a clearness of exposition and a critical selection of data that makes it serve exactly the purpose that the author had in mind, namely, a ground work upon which the student interne, and general practitioner may acquire a more comprehensive knowledge of the art of anesthesia. I know of no other text that I would so gladly place in hands of junior internes indeed, the great body of internes have been waiting for a practical treatise of just this sort.

Of course it is true that one lays down the book, after going through the three hundred odd pages without a new concept of the theory of anesthesia, of the literature of the subject, or of the underlying physiology or physiological chemistry of the lachrym bodies. But if one cavils at this, it is because he failed to read the preface, and therefore missed the purpose of the work. Flagg's object is distinctly

the *art* as contrasted with the *science* of anesthesia; and it is art with a large A, for nowhere in the text does one find a scintilla of evidence of polemic adherence to any special technique of administration.

Nothing Flagg very wisely says should be permitted to dominate over the art in the broader sense. The technical principles underlying the use of anesthetics serve as the keynote in every chapter.

And these chapters are cleverly arranged so as to be very inclusive without being burdensome to the beginner. Part I, made up of thirteen chapters, is devoted to general anesthesia, local anesthesia and mixed anesthesia. Under general anesthesia, there is discussion of complete and incomplete (rausch) general anesthesia, a detailed discussion of the induction and maintenance of and recovery from general anesthesia, the signs of anesthesia, their significance and interpretation, either by the oral, pharyngeal and intratracheal insufflation methods ethyl chlorid, chloroform, and finally nitrous oxide alone and in combinations with oxygen and ether. Each anesthetic is dealt with under the headings General Considerations and Technique of Administration, and always in the most eminently practical fashion. Carefully selected illustrations do much toward clarifying the text.

The twelve pages devoted to local anesthesia are necessarily totally inadequate and we believe the author could have left them out to advantage, merely confining himself to volatile anesthetics. Local anesthesia has grown to dimensions far and away beyond small compass even when skillfully condensed by Flagg. Of course, such a change of title would have cut out the chapter on mixed anesthesia, but till we think it would have been worth while. By mixed anesthesia Flagg means spinal anesthesia. Heretofore the phrase mixed anesthesia has referred to compounds such as the A. C. E. mixture or to mixed local and general anesthesia. We wonder whether Flagg has not introduced an element of confusion in changing the nomenclature.

Part II is devoted to Factors Incidental to the Actual Administration of the Anesthetic, and discusses preliminary medication, post-operative treatment duties of the nurse, before, during, and after anesthesia, rebreathing emergency anesthesia, anesthetist's records, aspirators, and finally a closing chapter on The Point of View of the Patient. This final chapter on The Point of View of the Patient is, in its way a classic. It breathes a spirit that one rarely encounters in a medical book, and ought to be issued in leaflet form and taught catechism fashion to every anesthetist, be he embryonic or full fledged.

THIS next volume is the one referred to earlier. In this review as forcing upon us the conviction that even from the purely technical side we are grad-

nally being forced into more limited surgical specialization. The development of specialties within specialties and the gradual conquest of the more inaccessible cavities of the body to surgical approach have been a very interesting phenomena in the history of medicine. Nowhere perhaps is this evolution more aptly illustrated than in the field of laryngology. From Bozzini's first attempts to explore the human larynx by means of his crude laryngeal speculum and Garcia's subsequent perfection and practical employment of the laryngoscope until the achievements of the present day the march of progress may be said to have followed instrumental and mechanical inventive genius. The simple Garcia laryngoscope had its limitations for the more inaccessible parts of the larynx could not be examined with it. The introduction of suspension laryngoscopy and bronchoscopy by Killian and by Bruening marked an epoch in laryngeal surgery rendering possible the employment of surgical measures in the deeper parts of the tracheobronchial tree. The efforts of Jackson have still further developed this field of laryngology so that today endoscopy and laryngeal surgery constitute a special field in themselves.

Until within comparatively recent years lung surgery through the bronchi and the removal of foreign bodies from these parts was practically unknown. Jackson by his instrumental innovations his high degree of technical skill and by the repeated demonstrations of his methods upon the profession has so simplified the technique of this comparatively new and difficult branch of surgery that he has placed it within the reach of the surgeon of average skill. In considering therefore Professor Jackson's *Peroral Endoscopy and Laryngeal Surgery* it must be remembered that this field owes its advancement and its present technical development to the ingenuity of the author himself.

The work is not a textbook in the general acceptance of the term. It is an exhaustive reference work that unquestionably occupies the premier rank in this field. The volume consisting of 705 pages, is not confined solely to bronchoscopy and esophagoscopy. It deals fully with the surgical conditions of the tracheobronchial tree and the esophagus. Symptoms and diagnosis are omitted except in so far as they are necessary for the elucidation of the endoscopic text. The essential aim of the author has been to devote his subject matter to the technical aspects of endoscopy and laryngeal surgery and their associated operative problems. The author is quite candid in the discussion of his results and in order that bronchoscopy like any other department of science shall profit by its failures he gives (pages 318-32) the histories of some of his un-

successful cases of bronchoscopy and points out the reasons for the unavoidable lack of success. The book is divided into two parts. The second part is devoted to laryngeal surgery taking up the consideration of Tracheotomy, Intubational Dilatation of Laryngeal Stenosis, Laryngectomy, etc. and is intended for the already experienced surgeon. The same may be said to apply to part one.

Although Jackson is an enthusiastic advocate of direct laryngoscopy he nevertheless makes it a rule whenever such examination is possible to examine every case by the indirect method first except in infants and in urgent cases in adults.

What will appeal to the reader is the orderly arrangement of the work and the thoroughness with which details usually skimped are discussed. Thus the subjects of instruments (the author showing preference of course for those of his own invention or modification and with which he has obtained the best results), anesthesia, source of light, introduction of the esophagoscope etc. are taken up separately and in minutest detail.

That the acquiring of skill in bronchoscopy especially in the extraction of foreign bodies means traveling over an exceedingly rocky road may be judged from the author's dictum that no one should think of attempting for the first time to remove a foreign body from a human being until he has at least 100 times removed a foreign body from a dog.

And again, Endless patience is an essential. The greatest percentage of successes will accrue to him who is so constituted to work calmly and deliberately yet quickly and accurately under severe stress of prolonged work with one eye where a mistake or lack of promptness or accuracy may mean the death of the patient.

The chapters on Foreign Bodies in the Larynx and Trachea, Mechanical Problems of Foreign Body Extraction, Esophagoscopy for Foreign Bodies, Bronchoscopy in Diseases of the Trachea and Bronchi, Diseases of the Esophagus (the latter comprising 89 pages) are all exhaustive treatises on their respective topics and reflect Dr. Jackson's wide experience and keenness of observation. This brings up another point. While other laryngologists may differ with Jackson on some points Dr. Jackson's statements bear the stamp of deep conviction resulting from broad experience.

The book is profusely and splendidly illustrated and it is safe to predict that when the warring nations in Europe will have resumed their former positions in peaceful science there will be a demand for the translation of the work, certainly into German, and perhaps also into other foreign languages.

BOOKS RECEIVED

Books received are acknowledged in this department and such acknowledgment must be regarded as sufficient return for the courtesy of the sender. Selections will be made for review in the interests of our readers and as space permits.

THE MEDICAL CLINICS OF CHICAGO, Vol. II, Nos. 1 and 2. Philadelphia and London W. B. Saunders Company 1906

THE CLINICS OF JOSEPH B. MURPHY, M.D., of Mercy Hospital, Chicago. Edited by P. G. Skiffers, J. M.D. August, 1906 Philadelphia and London W. B. Saunders Company 96

DISEASES OF CHILDREN. By Ed. In E. Graham, A.B. M.D. Philadelphia and New York Lea & Febiger 96

BACTERIOLOGY—GENERAL, PATHOLOGICAL, AND TEST-TUBES. By Arthur Imrie Kendall, B.S., Ph.D. D.P.H. Philadelphia and New York Lea & Febiger 96

THE TREATMENT OF DIABETES MELLITUS WITH URICACIN. BY TROUSSEAU. THE DISEASE BASED UPON ONE T. URICACIN CASE. By Elliott P. Joslin, M.D. Philadelphia and New York Lea & Febiger 96

THE DIAGNOSIS AND TREATMENT OF SURGICAL DISEASES OF THE SPINAL CORD AND ITS MEMBRANES. By Charles A. Elsberg, M.D. F.A.C.S. Philadelphia and London W. B. Saunders Company 96

THE AMERICAN YEARBOOK OF ANATOMY AND PHYSIOLOGY. F. H. McMechan, A.M. M.D. Editor New York Surgery Publishing Company 916

A PRACTICAL TREATISE ON DISORDERS OF THE SEXUAL FUNCTION IN THE MALE AND FEMALE. By Max Hoeber, M.D. Philadelphia F. A. Davis Company 96

THE EXPECTANT MOTHER. BY HAN. CHILD. By Margaret J. Medelard, R.N. With introduction by Harold A. Miller, M.D. Philadelphia The John C. Winston Company 96

THE PRACTICAL MEDICINE SERIES VOL. IV—GYNECOLOGY. Edited by Emilias C. Dudley A.M., M.D., and Herbert M. Stowe, M.D. Chicago The Year Book Publishers 96

THE MOTHER. HER CHILD. By William S. Sadler, M.D. and Lena K. Sadler, M.D. Chicago A. C. McClurg & Co. 96

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INTERNATIONAL ABSTRACT OF SURGERY

NOVEMBER 1916

COLLECTIVE REVIEW

PRESENT STATUS OF ROUND LIGAMENT SHORTENING AS A SURGICAL CURE IN UTERINE DISPLACEMENT

B. IDNEY A. CHALFANT, M.D., F.A.C.S., PHILADELPHIA
AND
WILLIAM A. MCGEE, M.D., F.A.C.S., PHILADELPHIA

THERE have been many reports of the operation of correcting displacements of the uterus during past years. Two of these were a little publicized, namely, those of that of Franklin H. Martin in 1884 and that of Albert M. L. in 1887. These two articles have been freely used in the preparation of this review.

We have included in this review all of the operations for uterine displacement either abdominal or vaginal but have limited it to those in which the round ligament were utilized. For convenience the following classification has been adopted:

1. Inguinal
2. Vaginal
3. Intra-abdominal
4. Fixation to the anterior surface of the uterus
5. Fixation to the posterior surface of the uterus
6. Fixation to the anterior abdominal wall.

ABDOMINAL PERITONEUM—ALEXANDER TYPE

Alquié in 1844 first suggested this operation and performed it on the cadaver and on animals. The first record that we can find of this work is the report of a Committee of the French Academy of Medicine appointed to investigate the operation. Alquié describes his technique as follows:

With the patient in the horizontal position the uterus replaced the surgeon determines the

course of P. Ovarian Ligament and selects a point in the middle of it at which point a incision is made a little obliquely to the crural arch and about one centimeter in length. If the knife is carried too far a small branch of the superficial epigastric may be cut which can be promptly tied. The crural arch exposed an incision is made in it a little obliquely to its fibers and two centimeters in length always keeping to the middle part of P. Ovarian Ligament. Behind the cellular tissue thus exposed there appears a point of deep red color enclosed in a sheet of dense cellular tissue this is the round ligament called the utero-ovarian. Picked up with tissue forceps this cellular envelope is opened and the cord is seized and drawn out with careful manipulation.

The peritoneum presenting at the ring a delicate incision is made around the cord for the purpose of dividing the cellular fibrous sheath which accompanies it and it is freed with the handle of the instrument. Finally by gentle tension the cord is brought out side—it may be drawn out to the extent of 10 centimeters or more—then a threaded needle is passed through the thickness of the cord and is attached down in the lower end of the incision. The margins of the wound are reunited with two sutures after which the operation is done in the same manner upon the opposite side.

When the condition that this operation was proposed seventy years ago the reception accorded to what would today be rather a minor

operation shows very forcibly the wonderful advances of surgery

After giving an outline of the plan proposed by Alquié, the committee reassured the members of the Academy by stating

"To this brief description, which will suffice to show the importance of the operative procedure involved your committee wishes to add before going further that it is all pure theory that M. Alquié has never performed the operation except upon cadavers, and that he does not seem disposed to employ it in the living subject except in animals. This assurance once given we may proceed with less apprehension in considering his work.

And they finally gave this very qualified approval

The operation (which requires always its duplicate upon the opposite side) not being at all admissible in practice, we have the honor to propose that the Academy give its approval to M. Alquié for having had the prudence not to practice it upon the living subject and that it recognizes that there exists in his work some anatomical considerations worthy of interest.

In (1882) William Alexander (4) of Liverpool published his article in which he reported three cases. He devised the operation and developed the technique without knowledge of Alquié's work which had been done almost forty years before. His technique is very similar to Alquié's.

The operation is performed by cutting down upon each abdominal ring gathering up the ends of the ligaments freeing each from its nerve and gradually releasing them by patient and cautious traction from the neighboring tissues until the position of the uterus as ascertained by the finger in the vagina, satisfies the operator. The ligament is then stitched to the tissues around the ring and the loose ends attached to each other on top of the skin or rolled around two pieces of wood which are fastened together in the middle line.

Adams (5) (1882) of Glasgow had for two years been demonstrating in the anatomical rooms the same procedure but had never performed it on a patient. His technique is practically the same as that described by Alexander.

An incision made over the external inguinal ring and a very careful dissection carried downward expose the pale and struggling fibers of the round ligament as they emerge from the ring and take attachment to the dense areolar tissue of the mons veneris. When these fibers are grasped by the forceps *en masse* and steady traction is made, it is found easily practicable

to draw them freely outward to the extent of one or more inches. In the dissection care should be taken to exclude the inguinal nerve for its rupture under traction implies considerable pain. Under the necessary traction the peritoneum does not follow the ligament as it is extruded, but separates and peels off. There is therefore little risk of an inguinal hernia resulting and any such apprehension is reduced to a minimum when it is borne in mind that inguinal hernia does not commonly occur in the female. The incision about two inches in length should be made obliquely and directed toward the mesial line and this oblique direction will be found to facilitate the search for the ligamentous fibers much better than a vertical opening. The search for the fibers of the ligament must be made cautiously and with much patience and little haste for this is the difficult part of the operation. When fairly exposed clearly traced and isolated they should be grasped by broad pointed forceps—small polyp forceps are very suitable—and following the guidance of the ligaments, the forceps should be thrust well into the inguinal ring and the ligament laid hold of as high as possible. When it begins to yield to the traction it may be pulled out to any desired extent. Five or six catgut ligatures passed over and under the ligament will sufficiently ensure its attachment to the surrounding tissues while separate ligatures close the wound excepting at the most dependent part. Antiseptic dressing strict rest in bed and the action of the bowels restrained for a few days by means of opiates, should suffice for the after treatment.

There have been many modifications of the technique of Alquié Alexander Adams. The opening of the inguinal canal was advocated by Bompiani (6) Roux (7) Kocher (8), Chailot (9), Gardner (10) Cleveland (11) and Edelbohl (12). In an effort to increase the applicability of the operation Goldspohn (13) advocated opening the peritoneum at the internal ring and through this opening separating uterine or adnexal adhesions. This was also suggested by Fritch (14) Maly (15) and Kroening (16). Bouleux (17) for the same reason, combined the Alexander operation with a posterior colpotomy. Peterson (18) with either a transverse or median incision Sandberg (19) with a median laparotomy Kreutzmann (20) Kuestner (21) Schlemminger (22) Rumpf (23), and Palm (24) with a laparotomy by means of the anchor incision of Kuestner Rapin and laparotomy by the Pfannenstiel incision was used by Spaeth (25) Frantz (26) Werth (27) and Littauer (28).

FIXATION OF ROUND LIGAMENTS

Duret (29) and Franklin Martin (30) (1896) separate the distal ends of the ligaments from their attachments and bring one across the symphysis above the fascia and tie them together.

Abbe (31) (1896) splits the fascia over the canal and after separating the distal end from its attachments uses the loose end as a living suture for the double purpose of closing the canal and fixing the ligament.

Impallomeni (32) (1912) using the Pfannenstiel incision drills the os pubis from before backward and passes the free end of the ligament through this opening and sutures it to the ligament in front of the opening. A double pointed nail is then driven across the opening.

Figueras (33) (1913) splits the canal and draws out a loop of the round ligament. By means of blunt dissection and a ligature carrier this loop is passed upward beneath the external oblique out through the fascia again back and out and sutured. He thus makes three punctures of the fascia of the external oblique.

The advantages of the Alqué Alexander-Adams operation are that it does not necessitate opening the abdomen the shortening of the ligaments is in the normal course of the ligaments the strongest portion of the ligament is utilized and it does not interfere with subsequent pregnancy or labor. The disadvantages are its limited field on account of the difficulty of determining the absence of uterine or adnexal adhesions which contra-indicate the operation the danger of subsequent hernia the impossibility of locating and correcting the pathology of other abdominal organs in some cases painful scars and as reported by some operators a rather high percentage of recurrence. The modifications which involve opening the abdomen either by the vaginal or inguinal route have divested the operation of its greatest advantage.

Laparotomy by any of the ordinary methods gives opportunity to care for disease particularly of the adnexa or appendix and permits examination of the organs in the upper abdomen. With the abdomen opened it is much easier to shorten the ligaments by some intraperitoneal method than to make additional incisions over the inguinal canals. This type of operation appears to have at the present time a very limited field of usefulness.

VAGINAL OPERATIONS

Wertheim (34) (1896) seems to have been the first to use the round ligament in vaginal operations. He attaches the round ligaments 1 or 2

centimeters from the uterus to the vaginal wall. In one case he shortened the round ligaments by doubling them on themselves and suturing them with silk.

Guenther (35) (1896) suspends the uterus by the round ligaments by passing a catgut suture from within the abdominal cavity outward through the anterior abdominal wall and tying the sutures on top of the skin.

Kiefer (36) (1896) through the vaginal incision doubles the round ligaments as in Mann's operation.

Vineberg (37) (1896) gives his technique which he has used in two cases. After delivering the fundus Vineberg passes a suture on either side embracing the round ligament and a portion of the broad ligament adjacent to the uterus. These sutures are carried through the vaginal flaps below the pubic arch at the side of the pelvis and tied.

Byford (38) (1896) picks up the round ligament as close to the pubic end as possible and sutures it to the uterus above its normal insertion. This is combined with suture of the fundus of the uterus to the peritoneum covering the upper portion of the bladder.

Goffe (39) (1897) first delivers the fundus. Then the round ligaments are caught with forceps at a point as far from the uterus as can be drawn to the site of origin of the ligament. This distance is usually 2.5 to 3 inches. The intervening ligament is folded into a loop the tip of which is attached to the ligament distal to the forceps. The point originally caught is then attached to the uterus at the origin of the ligament and the three segments of the ligament sutured together.

Ries (40) (1901) divides the round ligament at its uterine end and separates it from the broad ligament for 4 centimeters. He then tunnels the anterior wall of the uterus with a knife and draws the ends of the round ligaments into this tunnel from either side and fastens them with catgut.

Childs (41) (1905) folds the round ligaments upon themselves about as in the Goffe operation and also shortens the sacro-uterine ligaments.

Shurman (42) (1913) divides the round ligaments 2.5 centimeters from the uterus and separates the proximal portion from its broad ligament attachments. This is then sutured to the upper surface of the anterior vaginal mucosa.

Vaginal operations on the round ligament are for the average operator not easily performed and have not become popular except in the practice of a few men specially skillful in operating by

this route. It is difficult to get an exposure of much of the ligament and they all depend upon the outer or weakest portion of the round ligament. There would also seem to be danger of causing sufficient traumatism during the operation to produce adhesions and possible trouble during a later pregnancy and there is no opportunity to examine for and correct the pathology of other abdominal organs. Operations of this type have a limited field in obese patients in whom a laparotomy is undesirable and possibly in those for whom extensive plastic operations are required where vaginal shortening of the ligaments would decrease the time of the operation and in this way lessen the risk.

INTRA ABDOMINAL FOLDING

Wylie (43) (1889) seizes the round ligament at its middle, scarifies the inner surface, and sutures the two folds together with the loop to the outer side.

Polk (44) (1888) freshens the inner surface of each round ligament for some little distance along its middle part and sutures the raw surfaces of the two ligaments together thus making an anastomosis between the bladder and uterus. Ruggi (45) unites a point of the round ligament near the internal ring to a point near the uterus with a single catgut stitch. Bode (46) does practically the same thing, but in addition takes a stitch into the cornu of the uterus.

Mann (47) (1895) catches the ligament with two forceps dividing it into three equal parts. The point at the outer forceps is sutured under the point where the round ligament is inserted into the uterus. The ligament at the site of the other forceps is then sutured to the outer extremity of the round ligament as it leaves the abdominal wall. In his first operations he used silkworm gut sutures but later silk or catgut, and finally used several fine catgut stitches along the course of the folded ligament. In this way he has a triple fold of the round ligament.

Jonesco (48) (1897) freshens the peritoneum at each end of the ligament and sutures these two raw surfaces and the sides of the loop together with silk. The layer of the broad ligament participating in the fold is then united by means of a suture passed in the form of a U.

Morris (49) (1900) makes a small opening in the peritoneum draws out a loop of the round ligament for two or three inches, sutures the folds of the loop together tucks the loop back into the opening of the peritoneum and closes the opening.

Byford (50) (1903) folds the ligaments to the inner side and sutures the ligament one half inch from the uterine end to a point one-half inch from the internal ring. The inner edges of the loop are touched with a chemical irritant and then sewed together. The end of this fold is then touched with the irritant and stitched forward and beside the bladder about opposite and a little above the level of the external inguinal ring.

Bissell (51) (1908) splits the round ligament longitudinally into an anterior and posterior portion. The greatest portion of each half is cut away leaving three-quarters of an inch of the distal part of the anterior half and the same amount of the proximal portions of the posterior half. These stumps are sutured, one to the uterus and the other to the cut end of the corresponding part of the round ligament, then sutured together and the broad ligament repaired. This is just the opposite of the ordinary operation for lengthening tendons.

Pankow (52) (1912) divides the round ligament at its middle sutures the proximal end over the internal ring and the distal end to the uterus, and then the two loops together.

Lorents (53) (1913) in his inaugural dissertation reviews the various operations and describes what he terms the N shaped suturing of the round ligament which he states was first performed by Zarati. This is very similar to the Mann operation in which the ligament is divided into three equal parts. Two loops are sutured into the internal ring and the other two to the uterus and the three segments beneath the broad ligament in a groove which has previously been made.

The early operations of this type all depending upon seroserosal adhesions furnished the greatest number of recurrences, and for that reason have been largely abandoned. The later ones in which the edges of the round ligament are freshened or the ligaments resected as in Pankow's or Bissell's operations would seem to be difficult to perform and to have no advantages over the more recent operations of fixation of the round ligaments to the anterior abdominal wall. In addition the operations of this type all fold up or resect the intra-abdominal portion of the ligament which is generally considered to be its stronger portion and depend for support upon the distal or weaker portion. This objection may be more apparent than real. When we consider the cases of retroversion that follow incomplete involution of the uterus and ligaments it would appear that at least in these cases the fault was with the intra-abdominal rather than the extra-abdominal portion of the round ligament.

FIXATION TO THE ANTERIOR SURFACE OF THE UTERUS

Dudley (54) (1890) denudes an oval area on the anterior surface of the uterus down to the vesical fold of peritoneum and a similar area on the inner surface of the round ligament of each side. These raw surfaces are then sutured together thus fixing the round ligaments to the midline of the anterior surface of the uterus at a point near the bladder.

Menge (55) (1904) catches the ligament near its middle draws it toward the midline and stitches the folds of the ligament together and then the loop across the anterior surface of the uterus on the level of the attachment of the round ligament. The folds of the broad ligament are then attached to the anterior surface of the uterus.

Coffey (56) (1905) seizes the round ligament with its surrounding peritoneum about one and one half inches from its origin and stitches it by four or five interrupted sutures of catgut to the side and front of the uterus about the insertion of the broad ligament then fastens the next inch and one half of the round ligament back to its original insertion with interrupted catgut sutures. The folds of the round ligament are then covered by bringing the peritoneum of the broad ligament over them with a continuous suture of catgut.

Latzko (57) (1908) fixes the most external point possible of each round ligament to the middle of the fundus of the uterus forming of the redundant portion a loop on the anterior surface with the convexity down and toward the midline. The inner portions of the two loops are sutured together and to the anterior surface of the uterus. The folds in the broad ligaments are then in turn sutured to the anterior surface of the uterus to close the openings and prevent internal strangulation.

Paudom (58) scarifies the inner surface of the round ligament, folds it up and sutures it to the cornu of the uterus and to the anterior uterine wall at the level of the cornu.

Jerie (59) dissects the round ligament free for the required distance makes a tunnel in the anterior wall of the uterine cornu one centimeter long draws the loop of the round ligament into this tunnel and sutures it at each end.

Wilks (60) (1912) brings both round ligaments across the front of the uterus and sutures them together and to the anterior surface of the uterus in the middle one half inch below the apex. The folds of the broad ligament are then sutured together and to the anterior surface of the uterus

for a short distance and the suture continued taking up the folds of the broad ligaments only down to a point one half or three fourths of an inch from the bladder. Sperling (61) (1906) simply quoted by Ashe (62) (1907) and Stewart (63) (1909) describe operations that are very similar to Menge's.

Of these operations the one devised by Coffey (56) has undoubtedly been the most popular in this country. He (64) in a later article gives in more detail the principles on which the success of surgical treatment of retrodisplacements of the uterus depends. He states that the support of all the abdominal organs is by folds of peritoneum that the round ligaments are muscular structures essentially a part of the uterus that muscular tissue has only one function contraction and that under continued strain the muscle will stretch. It is therefore illogical to depend upon the round ligaments for a constant support. In the operation he describes Coffey states that the uterus is supported by the broad ligaments and the round ligaments have time to rest and an opportunity as they are fixed under the peritoneum with catgut to shorten and straighten themselves.

Alieri (2) raises the point that an essential for stability of the correction lies in placing the uterus in its normal anteversion. The more the broad ligament is tensed and the lower the round ligament is fixed to the anterior surface the greater will be the elevation and anteversion of the uterus and the less the anteversion.

This objection seems to be met by Coffey (65) who in a more recent article reports the conditions found in five patients re-operated upon for other conditions. In all these the broad ligament was found holding the uterus in perfect position. The round ligaments had regained their normal size and their normal position under the peritoneum. In this paper the author reports 272 operations by his method with two known recurrences but apparently no report had been secured from a number of the patients. Suttner (66) reports 64 cases by the Coffey method with anatomical cure but symptomatic failure in one recurrence in two and one death from conditions having no relation to the ligament operation.

Goldspohn (67) objects to Coffey's statement that the peritoneal folds are the true support of the abdominal organs. He claims that the support from the abdominal walls is an important factor as shown by the number of cases of enteroptosis in patients with relaxed or weak abdominal muscles. The peritoneal attachments of the uterus must become greatly stretched dur-

ing pregnancy and once stretched they have no power of contraction. Pregnancy is the true test of operations for retroversion and unless patients are examined after they have passed through one or more pregnancies after the operation no conclusions can be drawn as to the value of the procedure. The round ligaments are composed largely of non-striated muscle fiber and are a part of the uterus itself and as such they undergo evolution during pregnancy and involution during the puerperium. "The anatomical structure and physiological nature of these ligaments make them a really live and rather intelligent medium for the purposes here aimed at. Rest will not result in strengthening a muscle; this is accomplished by exercise. That rest will not result in shortening the round ligaments is shown by the large number of women who have worn pessaries continuously for years with cure in only two per cent.

FIXATION TO POSTERIOR SURFACE OF THE UTERUS

Menge (68) first used the round ligament as a cover for the pedicles after removing diseased adnexa, and by fixing the ligaments to the posterior wall of the uterus prevented a recurrence of the displacement.

Stolz (69) draws each round ligament up across the inner end of the corresponding tube and sutures it to the posterior surface of the uterus with several sutures of silk.

Webster (70) (1901) perforates the broad ligament below the ovarian ligament from behind forward with a haemostat, grasps the round ligament and draws the loop through the opening in the round ligament. The loop is then sutured to the posterior surface of the uterus, and the sides of the opening to the round ligament.

Baldy (71) (1902) cuts the round ligaments at the uterine end. The free end is then drawn through the broad ligament below the ovarian ligament and attached to the cornu of the uterus on its posterior aspect directly back of the original point of attachment of the normally attached round ligament. The ends of the ligaments may be cut off to secure the proper degree of shortening and the point of attachment varied to suit the requirements of the individual case.

Franke (72) (1909), without knowledge of the work of Webster and Baldy, devised a similar operation. In young women, in order to avoid interference with pregnancy after drawing a loop of the round ligament through the broad ligament he fixed it to the side of the posterior surface of the uterus. In older women the two loops

were joined together as well as fixed to the posterior surface of the uterus.

Holleman (73) after Franke's paper states that he has been using the method for some time. He suggests that if anteversion is required the opening in the broad ligament should be high, but if elevation is desired the opening should be lower. He also sutures the opening in the broad ligament to the round ligament.

Dartigues (74) (1910) describes an operation that is very similar to Baldy's. The loops of the round ligaments are sutured together behind the uterus and if it is feared that the sling may slip either up allowing the uterus to drop below or down permitting the uterus to retroflex over it, the sling may be stitched to the posterior surface of the uterus with vertical stitches in the central, least vascular portion. Soren (75) (1911) proposes to simplify the technique of the Baldy Webster operation by pulling the round ligament through the broad ligament by the use of an ordinary wire hairpin.

Alherl (3) (1911) picks up the peritoneum covering the round ligament about 1 or 4 centimeters from the uterus and cuts it with scissors for 1.5 centimeters perpendicular to the course of the ligament. Through this incision a double loop of strong silk is passed under the ligament, the ligament is raised and the peritoneum is stripped back from it for some distance, most on the distal portion. Two ligatures are made a centimeter apart on the ligament and it is cut between them. The ends of the ligatures are left long.

With a Cleveland ligature carrier the mesosalpinx is perforated about a centimeter from the uterine margin, the ligature upon the distal portion of the resected round ligament is grasped and the ligature drawn through the aperture. On the corresponding side of the posterior surface of the fundus a tunnel 2 or 3 centimeters long is made with a lance bistoury in a nearly transverse direction passing from the margin of the uterus near the perforation in the mesosalpinx almost to the middle line. By means of the ligature the ligament is drawn through this tunnel until the resected end appears at the median end of the tunnel. Two sutures are placed at each end of the tunnel. They engage the uterine wall, about a third of the thickness of the ligament, and the overlying fleshy bridge. The central stump of the round ligament is then sutured to the peripheral portion with two silk sutures and the opening in the peritoneum closed.

Schmitz (76) (1913) in order to avoid the serous adhesions of the Baldy Webster opera-

tion which is the weakest kind of intra abdominal adhesion suggests a modification which he has performed in a few cases. He makes an opening in the peritoneum over the round ligament 3 or 4 centimeters from the uterus and divides the ligament between ligatures. The distal portion of the ligament is then separated from the peritoneum for a short distance. The ligature attached to the distal end of the round ligament is then caught with a Barrett ligature carrier and carried between the layers of the broad ligament to the posterior surface of the uterus underneath its peritoneal covering. A very small perforation is then made in the peritoneum of the uterus in the midline. The ligatures one from each side are then tied uniting the two ends of the round ligament. The latter are then secured to the posterior wall of the uterus by a few interrupted sutures of fine chromic catgut. The proximal ends of the round ligament are then sutured to the distal end as in Albers' operation and the peritoneum closed.

The Baldy Webster operation as it is commonly called in this country or the sling operation of the English and French surgeons is now commonly performed according to Baldy's (1906) later technique by stitching the loop of the ligaments together and to the posterior surface of the uterus. One of the most complete reviews of the end results of this operation was that by Polak (1913). He reviewed his results in 400 operations with only 4 not seen either by himself or his assistants after operation. He thus has 396 patients from whom to draw conclusions. Polak found a rather high percentage of complications as lateral version prolapsed and cystic ovaries sigmoid and intestinal adhesions. Relapse occurred in 10 patients and 30 others were wearing pessaries. Polak concludes that this operation should not be selected for heavy uterus with the cervix in the axis of the vagina. It succeeds depends on a small uterus a cervix pointing backward equally developed ligament and a careful technique.

The operations of Albers and Schmitz would seem to be rather difficult and tedious and liable to at least a part of the complications of the others of this type.

FIXATION TO THE ANTERIOR ABDOMINAL WALL

Olbhausen (1913) first utilized the round ligament in performing ventrofixation. He passes his suture around the round ligament immediately beside the uterus and then deeply through the abdominal muscles. This is completed on each side with two or three sutures

which are then firmly tied and thus not the uterus itself but the part of it next the round and broad ligaments is fixed to the abdominal wall. In view of the subsequent development of ventrofixation it is interesting to note that Olbhausen states that it is always advisable wherever possible to limit the operation to those patients whose condition or age preclude the possibility of the occurrence of a pregnancy.

Doler (1910) sutured the round ligaments into the lower angle of the abdominal incision. In his later work (1910) he was careful not to extend his incision below a point of 1 centimeter above the symphysis. On each side of the median line opposite that portion of the linea alba which has been preserved he makes a small opening through which a loop of the round ligament is drawn and fixed to the under surface of the skin.

Ferguson (1910) seems to have been the originator of this type of operation. He in his original operation made a median incision down to the fascia then a short incision through each rectus ligating the round ligament one inch from the uterus dividing it proximal to the ligature. The proximal end was then drawn up into the wound on each side and anchored to the peritoneum and the anterior sheath by the rectus. In his later work (1910) instead of dividing the round ligament as in his former technique he used the stab wound and loop as in Gilliam's operation but also closed the opening to the outer side either by a purse string suture from the stab wound down to the bladder and up to the uterus or by suturing the redundant portion of the round ligament to the anterior abdominal wall.

Gilliam (1911) modified Ferguson's original technique by pulling a loop of the round ligament through a stab wound to the side of the median incision and suturing the loop to the upper surface of the anterior sheath of the rectus.

Simpson (1911) (1903) describes his technique as follows:

1. Operations upon the lower genital tract such as curetting repair of cervix perineum etc. are often required the suspension being but a counterpart to the correction of the other abnormalities.

2. A median abdominal incision one and one half to three inches long is made just above the symphysis.

3. Adhesions to the uterus are freed and lesions of the adnexa are given such attention as they require.

4. The wound is held wide open by one

retractor which is drawn straight up, thus making the opening vertical and permitting the operator to look far into the sides of the pelvic cavity.

5 The round ligament is grasped by a delicate forceps one inch from its uterine attachment and drawn up to the surface of the wound.

"6 A silk suture is passed through the ligament at this point in such a way as to encircle about three-fourths of its circumference and to include about an inch of that structure in its grasp.

7 The needle is taken off and both ends of the suture are passed through the eye of a carrier.

8 The peritoneum is incised just below and in front of the round ligament. The carrier is then inserted and passed directly forward immediately beneath the peritoneum of the vesico-uterine pouch, to a point on the anterior abdominal wall just above Poupart's ligament and an inch and a half to the side of the median line where it again emerges.

"9. Both ends of the suture are grasped and the carrier is withdrawn.

10 One end of the suture is then threaded on a sharply curved needle which is passed into the abdominal wall so as to grasp peritoneum, muscle and fascia again emerging into the cavity.

When the two ends of the suture are tied the ligament is drawn into and along the subperitoneal channel made by the carrier. Both round ligaments having been thus secured the conditions existing are entirely analogous to those of an awning. The uterus represents the frame, the round ligaments and sutures attached, the cords by which it is raised that part of the abdominal wall caught in the grasp of the suture represents the pulley over which the awning cord runs and finally the peritoneum of the vesico-uterine pouch represents the covering of the awning. When the cords are tightened the uterus is raised just as an awning is. The peritoneum is thus folded loosely over the round ligaments and when the sutures are tied the uterus is held in normal anteversion just as truly and securely as the frame of an awning is kept more or less straight up after it has been raised and fastened.

Simpson reports three cases in his paper. In the first two instead of burrowing beneath the peritoneum it was caught up along its course.

Noble (86) (1903) using the transverse incision through the fascia and a vertical through the recti and peritoneum locates the ligament at the internal ring by blunt dissection from the outer

end of the incision and traction on the intra-abdominal portion. The peritoneum is then separated from the round ligament to prevent the formation of a funnel when the ligament is drawn up. A loop of the ligament is then drawn out on top of the muscles and sutured to the under surface of the fascia and if long enough to the loop from the opposite side.

Montgomery (87) (1904) brings the loop of the round ligament beneath the peritoneum of the broad ligament by a suture around the ligament and a ligature carrier draws it through the fascia and fastens it with catgut to the upper surface of the fascia. In his later papers (88) (1905) and (89) (1906) he advocates the Pfannenstiel incision.

Ill (90) (1903) modified the Gilliam operation by separating the rectus muscle from its anterior sheath, piercing the rectus and peritoneum drawing out the ligament and suturing it to the under surface of the fascia.

Bardescu (91) (1904) brings the loop of the ligament through the fascia and sutures the two loops together.

Barrett (92) (1905) makes a rectus incision and puts a ligature around the round ligaments two and one-fourth to two and one-half inches from the uterus. He then passes a curved forceps between the rectus and its anterior sheath, punctures the peritoneum at the internal ring and draws a loop of the round ligament out by means of the ligature previously placed. This loop is then sutured to the under surface of the fascia and if long enough the two loops are tied together.

Morison (93) (1905) ligates and cuts the ligament close to the internal ring and frees the proximal end from its peritoneal covering. This free ligament is drawn through an opening in the fascia and peritoneum at the outer margin of the rectus, the uterus is drawn up against the abdominal wall and the two ligaments are sutured to the fascia and to each other.

C. H. Mayo (94) (1906) passes a curved forceps laterally from the lower angle of the incision beneath the aponeurosis just over the muscle to the point where the round ligament leaves the abdomen. The point of the instrument then passes over the pulley of the round ligament and along its course but beneath the peritoneum to a point from one and one-half to two and one-half inches from the uterine horn where the peritoneum is penetrated the ligament is grasped and a loop pulled back through the tunnel. The loops from each side are then sutured together and to the fascia or if not long enough to perforations in the aponeurosis. Simpson (95)

(1911) showed that this could more readily be performed by using a long forceps curved to a right angle which he introduced through a puncture in the fascia one and one half inches to the side of the median incision.

Dudley (96) (1906) by means of a very heavy needle passes a loop of the round ligament from within the abdominal cavity through the internal ring and the fascia back through the fascia rectus and peritoneum and sutures it to the peritoneum at the point of entrance and of exit.

Campbell (97) (1905) makes a median incision to the peritoneum retracts the muscle makes a transverse incision in the peritoneum on each side at the internal ring draws a loop of the round ligament through this opening and fastens it to the peritoneum and under surface of the fascia.

Freund (98) (1906) folds the ligaments on the anterior surface of the uterus and stitches them together with some of the fibers of the uterine muscle to the anterior abdominal wall. Miller (99) (1907) modifies Mayo's operation by perforating the peritoneum close to the internal ring instead of at the point where the ligament is caught. Peters (100) (1907) describes his operation which is the same as that of Simpson in his later paper except that he goes obliquely through the muscle instead of to the internal ring. Benjamin (101) (1909) punctures the fascia opposite the internal ring catches the ligament one and one half inches from the uterus draws it out and sutures it to the upper surface of the fascia. Branch (102) (1910) modifies the Gilliam operation by closing the opening to the outer side of the ligament as suggested by Ferguson and Simpson and suturing the loop of the ligament to the under surface of the fascia. Crossen (103) (1910) passes a forceps under the fascia and obliquely through the muscle to a point about one inch from the internal ring where the peritoneum is penetrated and the ligament caught about one and one half inches from the uterus. Thinnig (104) (1910) describes the method he uses which he attributes to Richardson. He divides the ligament at the internal ring punctures the fascia at the linea semilunaris pulls the cut end of ligament through this opening and sutures it to the upper surface of the fascia pulling the fundus of the uterus against the anterior abdominal wall. In addition with the continuous suture which closes the peritoneum of his median incision he catches the wall of the uterus in front of the midline. Dicken (105) (1910) modifies the Simpson technique in cases with marked relaxation of the

ligament by first suturing a loop of the ligament back to the uterus as in the first step of the Mann operation.

Strobell (106) (1912) modifies the Gilliam operation by making an additional short incision over each pubic spine. A forceps is passed through this incision just above the pubic bone and obliquely outward the ligament caught and drawn out the slack in the outer segment of the ligament taken up and the loop sutured to the upper surface of the fascia. Caballero (107) (1913) describes an operation which he has used since 1902 which seems to be exactly similar to Crossen's. Byford (108) (1914) sutures the round ligament at a point one centimeter from the internal ring back to the uterine cornu and the edges of the resulting loop together. This loop is then brought forward beneath the peritoneum as in the Mayo operation and attached to the under surface of the fascia.

Talmey (109) (1906) modifies Olshausen's operation by using two sutures on each side the nearest one encircling the round ligament about 2 centimeters from the uterine cornu. Kohlmann (110) (1910) gives Bumm's technique of drawing a loop of the ligament through an opening in the peritoneum on either side of the abdominal incision and fastening it into the muscle. Vineberg (111) (1911) modifies slightly the Olshausen technique. He fastens each round ligament to the anterior abdominal wall with two catgut sutures the outer one about 4 centimeters from the uterus and the inner one encircling the round ligament at its insertion into the uterus. In addition in many cases he catches the peritoneum of the uterus in front of the midline with a few of the stitches that close the incision in the parietal peritoneum.

McArthur (112) (1911) splits the peritoneum on the anterior surface of the round ligament one inch from its uterine end to the internal ring. The raw surface of the ligament is sutured to the parietal peritoneum from the internal ring to within an inch and a half of the median incision. Neuhoff (113) (1913) does the same thing except that he does not split the peritoneum of the round ligament.

Neel (114) (1916) gives his modification of the technique devised by Kelly. He separates the fascia from the rectus muscle 4 centimeters to the side of the incision passes a silk suture through the muscle and peritoneum picks up the peritoneum of the anterior wall to the internal ring and of the round ligament to a point one or two centimeters from the uterine cornu where the ligament is pierced the suture being then carried

back through the abdominal wall to the starting point and tied.

The first of this type of operations Ferguson and Gilliam were devised to avoid the greater objection to ventrosuspension, that is, the liability to dystocia. The advantages are that it causes no interference with pregnancy or labor it utilizes the proximal or stronger part of the ligament. It is comparatively free from recurrence and is quickly and easily performed. After the publication of these papers, the objection was made that as there were two bands across the peritoneal cavity instead of the one in ventrosuspension there was a double danger of internal strangulation. This brought out a number of papers in rather rapid succession in which the writers reported their methods designed to overcome this objection.

At the meeting of the Southern Surgical and Gynecological Association Cincinnati in 1902 the papers of Ferguson (83) Simpson (85) and Noble (86) were read. In all of which the principles involved are very similar and were thus summarized by Simpson the ligaments are to be beneath the peritoneum, are to be directed forward and the proximal or stronger part of the ligament is to be utilized. He stated at that time that the procedure he devised permitted of many modifications to suit the ideas of the different operators. How accurately he foretold the future is shown by the number of modifications devised since that time which differ only in minor details from the previous operations.

Concerning the danger of internal strangulation Gilliam (115) (1911) stated that he had never seen or heard of this accident following his operation although it had followed many hundreds of operations by many operators. This seems to be just as true today as it was then, as we have been unable to find any cases of obstruction reported. But as Simpson (85) pointed out a patient may carry a congenital hernia for a great many years without ever being aware of its presence and develop a strangulation when well advanced in life. So it would seem that this objection even though it is only theoretical should be given weight. The retroperitoneal operations can be performed just as easily and with practically no more injury to the patient, and are free from this objection. That the results of this form of operation are good is shown by Simpson's (95) results, 97 per cent of anatomical cures. As pointed out by this writer there are three classes of cases in which success of the round ligament operation alone is not likely to be uniformly obtained

- 1 When the ligaments are very delicate.
 - 2 When the congenital attachment of the bladder is low and that of the sacro-uterine ligaments is high.
 - 3 When the sacro-uterine ligaments and the base of the broad ligaments have been very much stretched giving a decided prolapse.
- Boycé (116) has repeatedly called attention to the function of the sacro-uterine ligaments as an important factor in the maintenance of the uterus in its normal position. Where descensus of the cervix is a part of the retroversion some form of shortening of the sacro-uterine ligaments is necessary and unless this is done the patient will not be symptomatically cured even if the fundus of the uterus is in its normal position.

The majority of patients requiring correction of their displacements are those in whom it has followed a previous confinement. This points to the necessity of careful supervision of patients after their delivery to secure proper involution both of the uterus and its ligaments. This applies just as forcibly to those patients who have had an operation as to those who have had no such experience.

From this review of the various operations for shortening the round ligaments we would suggest the following as the principles upon which a satisfactory operation depends

- 1 It should be quickly and easily performed. As the condition requiring operation has of itself no mortality any operation for its correction should involve the least possible risk.
- 2 It should have a minimum of recurrences.
- 3 It should not interfere with subsequent pregnancy and labor.
- 4 The ligaments should be beneath the peritoneum to avoid the at least theoretical, danger of internal strangulation.
- 5 The proximal or stronger portion of the ligament should be utilized.
- 6 The shortened ligament should be directed forward or along the normal course of the round ligament.

It should be intraperitoneal to permit exploration of the adnexa appendix, or other abdominal organs.

8 It should involve the least possible traumatism to avoid post-operative intestinal adhesions.

9 It should not overcorrect. If the fundus of the uterus is held in contact with the line of incision a suspension or fixation is liable to take place.

It will be necessary to have reports of the end results in a large series of cases before any con-

sensus of opinion will be reached as to the value of the different procedures

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ABSTRACTS OF CURRENT LITERATURE

GENERAL SURGERY

SURGICAL TECHNIQUE

ANÆSTHETICS

Pembrey M. E., and Shipway F. E. Observations on the Influence of Anæsthetics on the Temperature of the Body. *Proc Roy Soc Med* 9 6 1x, *Sect. Anæsthetics*

The authors make the following statement in regard to heat elimination and production but give no experimental evidence or references to support the statements. Deep anæsthesia abolishes the regulation of both the loss and production of heat so that the response of the warm-blooded animals to external heat and cold resembles that seen in cold-blooded animals. A fall of external temperature diminishes, a rise increases the production of heat. It is this fact which complicates the problem. The internal temperature of a patient may show a fall, a rise, or no change according to the conditions involved during the period of anæsthesia. A fall in the rectal temperature from 100 to 97 F is within physiological range when the whole extent of the daily variation in temperature is considered, but in the case of an anæsthetized patient subjected to an operation in a warm theater (72 to 74 F) such a fall may occur within one hour.

During short operations of slight severity the necessity for precautions against the loss of heat is not urgent for in an adult there is owing to the mass of the body, a reserve of heat which is not rapidly dissipated in a warm theater. In such cases the advantages of warm ether as compared with cold, may not be so apparent. On the other hand, in the case of long operations or an operation upon a patient possessing a low resistance, the difference may be of great practical importance.

W M BOOTHBY

Gley. The Inevitable Dangers of Chloroform Narcosis. (Sur les dangers inévitables de la chloroformisation.) *Bull Acad de Méd* Par 9 6 1 xv 608.

In discussing a report recently submitted by Reynier a proposed compulsory chloroformization for diagnostic purposes in the French army Gley calls attention to the inevitable results of chloroform anæsthesia which are quite distinct from immediate or late accidents. These inevitable results are lesions of the liver and kidneys as well as alterations in the blood and general metabolism.

The first two are well known. Regarding the

blood, different experiments have demonstrated that in the course and especially at the end of chloroform anæsthesia there is neutrophile hypoleucocytosis and some hours later neutrophile polymorphocytosis. There is a modification in the form of the red globules and a diminution in their number. Chloroform lessens the globular resistance of individuals subjected to anæsthesia.

Gley states that research has shown that chloroform causes an alteration in the organic exchanges characterized by urinary hyperacidity and an augmentation of urinary chlorides and non-oxidized sulphur etc. Analysis of the blood shows a notable bipennia accompanied by acetonaemia and often acetonuria.

Owing to these effects of chloroform intoxication the author thinks that the functioning value of the liver and kidneys should be tested before submitting a patient to the effects of chloroform and particularly when successive anæsthesias are contemplated. In fact the author thinks that the habitual use of chloroform should be renounced on account of the accidents that follow its use. W A. BERNARD.

Page 11. M. Spinal Anæsthesia. *Guy* 11 p. 623 9 6 xxx 3

For all ordinary cases inhalation anæsthesia is the method of choice, but there remain many cases in which great advantage is to be gained by the use of spinal anæsthesia by means of which either the whole or the greater part of the shock is done away with and a more complete muscular relaxation is gained. The operations in which this method may be of especial importance are those for acute bony and soft tissue lesions, particularly if septic, any prolonged bony procedure likely to be followed by shock amputations, operation on the bones of the lower extremities and certain genitourinary operations.

Seventy cases in which the anæsthetic was given in the Trendelenburg position are reported, in which position it is better to combine general anæsthetic with the spinal, the small amount necessary to keep the individual unconscious having little if any undesirable effect on the patient who escapes the discomfort of lying prone for a long period.

The infection is given with the patient lying on the side immediately after which he is turned on the back and the thighs well flexed. Fifteen minutes

after the injection of novocaine and twenty minutes after stavaine the patient is placed in the Trendelenburg position. Twelve cases were operated on without any general anesthesia. In the remaining 55 there was perfect relaxation and in 15 in the three cases of partial failure a deep inhalation

anesthesia was necessary. There was no use of interference with respiration and no patient died before recovery from the induced paralysis. Nine cases died but analysis shows that probably in none of these was the spinal anesthesia responsible.

L. K. ARMSTRONG

SURGERY OF THE HEAD AND NECK

HEAD

Don. A. Treatment of Head Injuries in a Casualty Clearing Station. L. J. C. JJ

The author notes the treatment of 100 cases of head injuries operated upon since the war began most of them in a casualty clearing station which was located in France not far from the trench fighting and the cases came under treatment soon after the receipt of the injury. Casualty clearing stations are not fully equipped for work. They lack X-ray machines — a very important essential in the management of head cases. The result given by the author were obtained in the absence of X-ray evidence and is good as the results would naturally have been far better with more complete equipment.

The experience in the present war upholds the rule of early operation in all head cases. Trauma in motor ambulances is bad for head cases especially in winter. Delay means extension of sepsis and sepsis is responsible for the large majority of deaths either immediate or remote. External scalp wounds, injuries to the cranium, dura, brain and meninges all require early attention to prevent sepsis and thus can be given with better results because earlier where the casualty stations are than later on the line of communications.

The plan followed is to cleanse the scalp of all dirt, blood and hair. The field of operation should be guarded by clean towels, the scalp and wound are next painted with tincture of iodine and the wound is then excised freely leaving a clean-cut edge which is undamaged to the eye. If there is obvious injury to the skull trephining should be promptly done. A hole three-fourths of an inch in diameter is made at the side of the opening or fissure and the dura examined. The trephine opening may be enlarged with a rongeur and if there is no blood-clot opening in the dura or other injury nothing more is necessary. If the dura is injured it is slit up and spicules of bone or blood-clot are removed. Probing with a probe, catheter or finger should be avoided unless definite evidence of the presence of spicules of bone, metal, or other foreign body is detected. It goes without saying that pressure from intracranial blood-clot should be treated in the same way.

The flap incision which was extensively used in the beginning of the war and the removal of a big piece of the skull by the de Vibiss forceps are not suitable methods to use at clearing stations since

they interfere with subsequent operations that may be deemed necessary.

Shell wounds are prone to be lacerated to the brain abscess because of hair and dirt carried to the brain. The rifle bullet wound are less apt to be lacerated to abscess or other complication. Men with head wounds do not as a rule return to the color and lodged bullet should be removed at the hospitals where brain peculiarities are to be found. It is different in cases where lodged bullet fragments are suspected. They are much more apt to induce sepsis and its complications so that when possible even at a clearing station the rule is to remove them.

An opportunity to study the results of English surgeons who believe in huge scalp flaps and large cranial openings and those of the French surgeons who practice the linear or angle incision and small trephine openings is interestingly commented upon in favor of the latter which is considered far more appropriate in casualty clearing stations where lack of adequate equipment obtains.

Indications for operation are: (1) the presence of a penetrating wound of the head; (2) the presence of patient to stand a general anesthetic; (3) the presence of a surgeon with some experience in cranial surgery.

The average operator can always remove dirt from the wound by a clean-cut incision, open the cranium wide enough for the extraction of pieces of bone pressing on the dura or sitting in the brain, to favor drainage of blood or pent up brain debris and to restore pulsation. These essentials involve but little shock, they require a minimum of time and they are attended with immediate results. When so treated head injuries are followed by primary healing in most cases and cerebral hernia is the exception.

Though gas infection is rare in head wounds, free drainage should be afforded by plenty of drainage tubes inserted wherever drainage is called for, even in the brain opening. Ample drainage precludes the possibility of dead tissue persisting in wounds and when devitalized tissue is eliminated saprophages like bacillus aerogenes capsulatus can no longer thrive.

After battles only the mild cases should be transferred to the rear. The most serious cases should be retained for some time for treatment on the lines mentioned, which will put them in a position to bear the ill effects of transport. L. A. L. GARDE.

Cushing, H. Concerning Operations for the Cranio-cerebral Wounds of Modern Warfare. *Brit. Surgeon* 9 6 xxxviii, 60

Wounds of the head and extremities form a large majority of the total injuries in the present war as shown by recent statistics. It has been clearly proved that specialization in the treatment of wounds in this war is of the greatest value in returning wounded men to active service in a condition of comparative health.

The importance of all cranial wounds, however slight, is emphasized. Roberts found that 1 series of 40 supposedly minor scalp wounds 4 5 per cent had skull fractures with more or less severe intracranial complications.

The author is strongly opposed to the routine treatment practiced at some first line hospitals, by enlargement of the wound by a crucial incision, elevation of the depressed fragments etc. and gauze drainage. He cites cases in which the results of this treatment have been satisfactory or worse. He believes that in cases of cranial wounds removal to the base hospital where proper equipment carefully planned operations, aided by the X-ray can be had, is the wisest course. He advocates a flap-incision away from the wound, thorough exploration, closure of the incision with buried gauze sutures, supplemented by cutaneous ones (to be removed on the second day) to insure primary healing with scalp protection for the denuded dura or brain. If drainage is advisable, rubber tube drains in the distant angles of the incision should be used, gauze never. Under this treatment the patient's chances are better even after a delay of several days than with an immediate operation at an ill-equipped first line hospital.

The different types of cranial wounds from projectiles are described with their characteristic symptoms. An important one is the median tangential or gutter wound (excised the vertex), involving the lateral expansions of the longitudinal sinus, causing stasis in the large cerebral veins. The symptoms are those of immediate bilateral apastic paraplegia in the severer cases — homonymous syndrome. A mild case observed by the author showed weakness and paresthesia of both legs. The milder cases, even with depressed fracture may recover without operation. In the severer cases, with cortical injury operation should be undertaken only under the most favorable circumstances, the operator being prepared to control hemorrhage from a bleeding sinus by implantation of raw muscle or vulcanized fibrin fibers. Ligation to be avoided if possible. The same principles apply to the treatment of posterior wounds involving the occipital lobes and causing central blindness.

In general, the author believes that good results follow a primary operation with closure even four or five days after the injury, poor results with death from meningitis follow in cases treated at the front in the routine way and packed with gauze.

HORACE B. ARMY

Browning, W. The Anatomical Cause of the Frequency of Hydrocephalus in Childhood. *Med. Rec.* 9 6 lxxvii, 950

In the production of hydrocephalus two complementary conditions are found: secretion and retention, both processes normal within limits. Unless there is an abnormal damming back there can be no accumulation and it is this phase that the author especially considers.

Many partial and indirect factors have some bearing on this youthful potentiality: narrower passages, softer tissues, thin bones, metabolic growth-errors, etc. But back of these is an anatomical and mechanical peculiarity which is not ordinarily appreciated.

From a mechanical standpoint there are three causes of hydrocephalus: (1) oversecretion as by a block in the vein of Galen leading to excessive production of fluid; (2) closure of the outlets from the ventricles, as at the foramen of Monro, the foramen of the three outlets from the fourth ventricle; (3) interference with the efferents from the subarachnoid space. The first two are relatively rare and may occur at any time of life. While the third form may occur at any time of life there is an anatomical peculiarity which favors its formation in the early years.

There are two general classes of these efferents from the subarachnoid space: one may be called the quadruped or animal type, the other the (postnatal) human type. There may be additional minor outlets as along or near nerves or by direct absorption through the surrounding tissues.

The animal type of discharge consists of minute channels or vessels that lead from the pial subarachnoid space along outgoing nerves to the extraspinal tissues. In them these channels persist whereas in the human they exist only up to the time of birth.

When these routes become closed there is a compensatory process which gradually relieves the situation and allows for more complete drainage of the subarachnoid space. Perforation bodies gradually develop although they do not appear in large numbers until after the twentieth year. It thus follows that the earlier years of life are especially susceptible to hydrocephalus before this compensatory process has become established and after the closure of the animal type of vessels. J. H. SKILES.

Vilbrandt, G. and Morgan, J. D. Movements of Foreign Bodies in the Brain. *Arch. Radiol. & Electrother.* 9 9 vii.

The authors report two cases in which bullets penetrated the brain subsequently wandered from their original location.

In the first case the bullet moved from the frontal lobe to the wall of the ventricle in the period of two weeks intervening between examinations.

In the second case the bullet moved from the right parietal lobe outward and downward to the occipital lobe in a period of ten days.

Both cases terminated fatally. O. W. GREEN.

Keschner M: Large Endothelioma of the Dura Compressing Both Frontal Lobes *J Am M As* 1916 14 193

Keschner here with reports a rare case of a colored woman aged thirty in whom both frontal lobes of the brain were compressed by a large endothelioma of the dura diagnosis being verified by the pathologist's report of the necropsy. In this case exophthalmos was an early symptom and a post-neuritic atrophy resulted within a period of five months in total blindness.

There was an absence of the Babinski reaction but the abdominals were present. The Wassermann test was negative and the cerebrospinal fluid was under considerable pressure. The exact location of this growth was not easy to determine as the symptoms of cerebellar tumor are closely allied to those of frontal tumors.

The author calls attention to the relative value of early and of late symptoms of brain tumor also to the symptoms of tumor of the corpus callosum. He does not believe that mental symptoms occurring in brain tumor are necessarily confined to frontal lobe involvement.

At autopsy the brain measured 13.2 x 0 cm and appeared normal with the exception of the tumor mass.

The tumor was attached to the dura in the center of the olivary process of the sphenoid for the distance of one-fourth of an inch and connected with the brain by a few vascular strands. The macroscopical diagnosis was endothelioma.

Elliott C. Royster.

Priani P: Clinical Considerations of Lesions of the Hypophysis (Considerações clinicas sobre lesões da hipófise) *Pr Med e Arg* 1916 14 4

The author discusses acromegaly and hypophyseal dystrophies. He reports three cases with a greater or less degree of hyperpituitarism, i.e. enlargement of the face particularly about the inferior maxillary region, extremities enlarged, macroglossia, sexual disturbances characterized by diminution of function or lack of development, ocular disturbances lateral or bilateral hemianopsia or complete obfuscation. The radiograph showed a tumor of the sella turcica in each case. The tumor in the first case that of a man was of long and slow evolution and was diagnosed as a simple adenoma. The other two cases which were in females, on account of the rapidity of evolution were diagnosed as adenocarcinoma. The rapid increase in these cases caused a herniation of the growth from its habitual cavity with subsequent compression symptoms.

In these two cases the disturbances of vision were marked. Both of these cases were operated upon by the endonasal method and the tumors weighing respectively 100 gr and 12 gr were removed. Both patients died.

The author thinks the cases show the necessity

for early diagnosis and treatment as in advanced cases like the above the tumor is large and while surgical intervention offers the only chance of relief yet it is impossible to completely extirpate the tumor by any method now in use. W. A. BROWN.

NECK

Barnhill J F: Some Essential Points in the Anatomy and Surgery of the Thyroid Glands. *Am J S* 1916 3

After a preamble in which he makes a plea that the otolaryngologist should perform the surgery of the head and neck, the author proceeds to the subject in hand. The points of paramount importance in the surgery of the thyroid are: (1) the large blood supply entering the gland at its upper and lower poles; (2) the outer or surgical capsule and the inner or glandular capsule between which the dissection of the gland should be undertaken; (3) the parathyroid glands, one to eight, usually four in number, which lie in the intracapsular space.

The chief dangers of thyroidectomy are the anasthenia, hemorrhage and shock, suffocation from collapse of the trachea, injury to the recurrent laryngeal nerve, an injury to or removal of one or more of the parathyroid glands. Exophthalmic goiter patients are always grave risks due to their toxic state. To avoid suffocation from collapse of the trachea, a tracheotomy tube should always be at hand to be inserted at the first sign of obstructed respiration.

In the removal of the thyroid gland the author employs the horseshoe incision through the platysma, after raising the flaps he makes a vertical incision in the midline and inserts his finger in the intracapsular space between the ribbon muscles and the gland to separate the entire anterior surface of the gland before cutting across the muscles. After the muscles are severed and turned back, the blunt dissection by finger is continued from the upper pole to the point where the inferior thyroid artery enters the gland. This artery is ligated as near the surgical capsule as possible. The author lays stress upon the fact that whereas both the inferior thyroid artery and the recurrent laryngeal nerve lie in a sheath of their own between the trachea and the esophagus, the artery alone penetrates the surgical capsule of the thyroid and gland, and if ligated within that capsule insures the safety of the nerve. He never makes a special attempt to isolate the nerve.

The inferior thyroid artery also marks the limit of safety in regard to the posterior parathyroid glands which lie in the connective tissue close to the entrance of the inferior thyroid artery. In order to avoid the removal of this important structure the author cuts across the gland substance above this point and leaves a small lobule of gland tissue in situ. He believes that the operation on thyroidectomy for simple goiter should have a mortality no higher than tonsillectomy in adults, exophthalmic

gout cases should always be handled in consultation with a competent internist, and if possible no surgical procedure should be undertaken until the pulse has reached 120 beats per minute. Hemostasis is an important factor in the safety of all operations and should be especially carefully attended to in gout operations. E. FISCHER.

Goetsch, E.: Functional Significance of Mitochondria in Toxic Thyroid Adenomas. *Bull Johns Hopkins Hosp* 96 xviii, 29

The cause of thyroid intoxication in individuals who show only the presence of circumscribed adenoma has not yet been satisfactorily explained. Pressure of the tumor on surrounding normal tissue causing an expression of normal thyroid secretion into the circulation in excessive amounts has been advocated as the explanation, as has also the theory that the tumor or foreign body acts as an excitant on normal tissue thus producing increased secretion with its train of toxic symptoms. It has long been the experience of surgeons that removal of the adenoma is followed by clinical improvement if not by cure. The author has attempted to solve this puzzling problem by a close cytological examination of the tissue removed in cases of goiter.

A typical case of toxic goiter in a middle-aged woman is cited in detail. A goiter of many years standing after various nervous and physical traumas began gradually to manifest toxic symptoms. At operation a circumscribed follicular adenoma was removed from the right lobe and the isthmus. Operation was followed by more or less immediate improvement and in one year the patient was practically

normal. The usual histological study of the excised adenoma showed nothing to account for a hyperactivity of thyroid substance. The cells lining the follicles were low cuboidal or even flattened, and nowhere was there infolding of the follicles. Colloid was fairly abundant. There was no increase in vascularity. The usual histological examination would lead one to suppose that the adenoma was functionally inactive.

The author attempted to explain the hyperactivity of this seemingly benign adenoma by a close histological study. He chose a technique which shows clearly and easily the presence of structures commonly known as mitochondria granular rods or filaments occurring in the cytoplasm of all cells being more abundant in the active stages of cell life and diminishing in number as the cell becomes inactive or senile. Therefore it seemed logical that the more active glandular cells should show more numerous mitochondria.

Applying this theory to the adenoma in question by suitable technique of staining the mitochondria were demonstrated greatly increased numbers in the cells of the adenoma. Applying the hypothesis to adenomas removed from glands which were clinically inactive, no increase in mitochondria was observed. Frank cases of Basedow's disease were also studied, and they too showed marked increase in the mitochondria in the thyroid gland tissue itself. It would therefore seem probable that the presence of mitochondria in greatly increased numbers is directly correlated with an overproduction of an otherwise normal thyroid gland secretion. E. FISCHER.

SURGERY OF THE CHEST

CHEST WALL AND BREAST

Peck, G. A.: The Early Diagnosis of Cancer of the Breast. *Am J Surg* 96 vi, 85

The author reviews the recent literature giving in abstract the attitude of various writers toward breast tumors and the symptoms which they regard as valuable in making a diagnosis of these conditions, also the important laboratory tests that have been employed as diagnostic measures.

He makes no claim to originality in the article but gives a concise and orderly presentation of the clinical symptoms of breast cancer as contrasted with benign growths and calls attention to the valuable symptoms and methods that are employed in arriving at an early diagnosis.

His conclusion is based on his review of the literature as follows:

The clinical signs and history must form the basis for a diagnosis of malignancy of the breast.

1. Serology and other general laboratory tests, as at present perfected, are not dependable for the diagnosis of these cases.

2. Repeated examinations at regular intervals, are desirable in doubtful breast tumors, but the complete clinical picture should not be waited for before operation is decided.

3. The influence of physiological development and atrophy of the breast in which a tumor is present should be kept in mind.

4. Most tumors of the female breast at or near the twentieth year are benign whereas at or near the fortieth year they are malignant.

5. Section through into the tissue of a tumor of the breast is never justifiable for the purpose of diagnosis. Well-defined growths should include surrounding tissue when removed, but ill-defined ones are best removed with one-fourth or one-half the entire mammary gland.

6. Cross-examination of the fresh specimen by well qualified pathologist at the time of operation, is safer than examination of frozen sections alone.

7. One should not be content with a partial operation in breast tumors, if there is a question of malignancy. Only the removal of the lymphatics and the entire breast can effect a cure in such cases.

Learmonth M. E. Acute Mammary Carcinoma. Canad. Med. J. 1905 403

It is estimated that acute mammary carcinoma occurs in about 1 per cent of all breast carcinomata. Of the 40 cases reported only two are living past the five year limit. The average age of onset is about 40 years. The first thing noted is usually a lump in the breast during pregnancy. The course of the disease is rapidly fatal in from one to six months unless recognized early and appropriate surgical measures undertaken. The inflammatory spread rapidly giving a massive induration. About one-fourth of the cases have retraction of the nipple. The orange skin appearance of the skin due to the blocking of the lymphatics is a marked feature.

In case surgical intervention is not initiated early in the disease death follows from metastasizing. In case of a small tumor appearing in a pregnant breast and upon its increasing size the diagnosis lies between a carcinoma and tuberculosis because of the rarity of a tuberculous infection at this time. Acute infections are usually associated with the nipples. The author advises exploration with the cautery for immediate examination of the specimen microscopically and radical removal in as it proves to be carcinoma. HARRY G. L. C.

MacCarty W. C. and Mensing E. H. The Relation Between Chronic Mastitis and Carcinoma of the Breast. N. Y. Med. J. 1905 100

From the study of 36 mammary carcinomata and 406 cases of simple chronic mastitides certain questions and their answers have been evolved: (1) Carcinoma always associated with chronic mastitis. In this series of cases the association was constant. Is chronic mastitis always associated with carcinoma. In the experience of the author it certainly is not. Are there any conditions relative to the possibility of precancerous conditions in chronic mastitis which point to a possible etiological relationship between carcinoma and chronic mastitis. There are three distinct conditions of cellular activity in this parenchyma of the mammary acinus which bring chronic mastitis and mammary carcinoma into intimate association and legitimately prohibit the consideration of the one without the consideration of the other. The microscopic pictures of the pathology of chronic mastitis is given and the authors claim the line of demarcation between the acinus and the stroma is sometimes confused thereby making it impossible to accurately state whether one is dealing with carcinoma or not.

There are three distinct histological pictures in chronic mastitis the first being characteristic of all chronic mastitis the second, characteristic of some specimens of chronic mastitis the third in its earliest stages is associated with the first and second conditions. The third condition is a recognized picture of carcinoma. The first is a benign condition, and with our present knowledge the clinical significance of the second condition is still un-

determined although it represents the precancerous histological picture.

From these facts the authors believe that there certainly is an association of chronic mastitis with carcinoma but cannot ascertain in all that chronic mastitis is an etiological factor in mammary carcinoma.

The average age of the 6 patients with carcinoma was 40 years in comparison with the average of 43 years of 406 patients with simple chronic mastitis. A discharge from the nipple is present in 4 per cent of all carcinoma and 6.6 per cent of all chronic mastitis. Trauma as a possible etiological factor in the development of chronic mastitis and cancer is greatly minimized in this series. The comparatively small percentage of patients with carcinoma recorded in the series only 6 gave a history of trauma while 44 with chronic mastitis gave similar histories. In this series 1 per cent of the patients with carcinoma and 1 per cent with simple chronic mastitis were unmarried which minimizes to a certain degree the possibility of lactation and its coincident infection.

Pathologically carcinoma is not a condition which is dependent upon the age of the subject but on some other condition of the tissues. Of all cases of chronic mastitis 3 were diagnosed correctly by the clinician the other 6 depended on fresh tissue diagnosis. In 3 of these cases of carcinoma or the breast clinical diagnosis of the glandular involvement showed that only 10 or 30 per cent actually had had it.

These errors emphasize the great value of an immediate fresh tissue diagnosis in connection with operative interference. The authors believe that practically one out of every 10 patients with cancer of the breast may be saved from operation if the surgeon has a competent surgical pathologist associated with him in his work.

From the foregoing facts the authors have emphasized the following five points:

1. Cancer of the breast is always associated with chronic mastitis.
2. The percentage of legitimate error in the clinical diagnosis of simple chronic mastitis and carcinoma is respectively 6 per cent and 3.0 per cent.
3. The percentage of legitimate error in the clinical diagnosis of the condition of axillary glands is 30 per cent.
4. There are three distinct histological pictures of chronic mastitis the one extreme in its benign condition, and the other extreme in its malignant condition. The mean which may be easily recognized is at present doubtful.

The association of the two conditions is too close to allow the consideration of one without the consideration of the other.

The authors believe that following to be the true logical plan. Conditions of the breast which are associated with clinical signs of carcinoma

should be treated radically. (3) In the doubtful cases of women near or over 35 years of age, the entire mammary gland should be removed for immediate examination. If primary or secondary hyperplasia be present nothing more should be done. If tertiary hyperplasia be present, a radical operation should be performed.

In doubtful patients, near or under thirty five years of age, a wide section of mammary gland, including the pathological condition, should be removed for examination. If primary hyperplasia be present nothing more should be done. If secondary hyperplasia be present the rest of the mammary gland should be removed and if tertiary hyperplasia be present the radical operation should be accomplished.

ERR. C. ROUSSEAU.

Lambrethsen, J. A Rare Mammary Tumor (Ein seltener Mammatumor). *Nordiskt Läk Stockholm*, 9 6, *Kirurgi* 6.

Lambrethsen describes and illustrates a mammary tumor which he classifies as a sebaceous carcinoma. The tumor showed strips of clear cells lying in a groundwork of hyaline connective tissue. He bases the diagnosis on (1) the form of these cells which have the same developmental characteristics as sebaceous glandular cells (They are polygonal with rounded angles so that they are almost oval in form.) (2) the clear appearance of the cells in which the protoplasmic granules gave at the first glance such a resemblance as to suggest the thought that the sebaceous glands formed the starting point of the tumor.

W. A. BROWN.

Pallases E. and Roubier C. Primary Tumors of the Pleura (Les tumeurs primitives de la plèvre). *Arch. Méd.* 9 6 1 43.

Primary tumors of the pleura have always been considered a rarity that existence has even been denied by some. The authors however consider the fact of their existence as indisputable as evidenced by many undeniable cases in the literature. They report three personal cases in detail. The demonstration in each case was made at autopsy. Histologically the three cases were malignant lipoma, a malignant tumor of the fibrous tissue, and a benign tumor of the fibrous tissue.

Primary tumors of the pleura may be divided into three categories: benign mixed, and malignant. Benign primary tumors are rare but some observations of lipoma, chondroma, and fibroma have been recorded. In addition purely inflammatory neoplasms have been noted (syphiloma and tuberculoma) on the pleural surface. There is a variety of fibrotuberculous pleural hypertrophy which can give rise to sessile and pediculated productions and may attain a considerable volume.

In the class of mixed tumors the authors place the recorded cases of chondrosarcoma, myxofibromatous sarcoma, myxolipomatous tumors and the like. Malignant primary tumors of the pleura, although comparatively rare are yet met

with more frequently than the two preceding classes. Pleural cancer presents itself in two forms, diffuse and circumscribed. Such tumors have been designated under a variety of appellations, i.e., sarcomatous, endothelial sarcoma, proliferating lymphangitis, etc. but all may be placed in the two classes of sarcoma and endothelioma. Sarcoma of the pleura are very similar to tumors of the same kind observed in other organs; they may be fusiform or giant-celled endothelioma occur more frequently than sarcoma. They are ordinarily diffuse accompanied by abundant hemorrhagic infarction and metastases are more often met with than in sarcoma.

Surgical intervention is or should be confined to cases where the tumor is clearly circumscribed and of considerable volume so that it shows symptoms of compression. Guyot and Parcelier in 39 collected cases of malignant tumors of the pleura found 7 surgical cases; those in which there were no metastases. The apparent operability was 37 per cent. Three were operated upon, the others which would have been fit for operation having been found at autopsy. In one of the operated cases the patient was in perfect health two years later.

Although extirpation is rarely attempted, the author thinks that prudent surgical intervention will be able to corroborate the prognosis where the tumor can not be surgically removed, particularly when there is an early diagnosis.

W. A. BROWN.

Goollfoud and Arcelin. Extraction of a Free Bullet from the Left Pleura After Establishment of an Artificial Pneumothorax (Extraction d'une balle mobile dans la plèvre gauche après établissement d'un pneumothorax artificiel). *L'Ann. Méd.* 9 6 1 43.

The case reported by the authors was that of a man who was found to have a movable bullet in the left pleura. Believing that extraction could be more readily accomplished by the prior establishment of an artificial pneumothorax this was done according to the Forland procedure.

One month later when the patient was accustomed to breathing with one lung a wide incision of the pleura was made, there being no appreciable respiratory trouble. The bullet being displaced a second incision was made in different intercostal space and the bullet removed.

The double intervention although it might have been avoided had the advantage of demonstrating how the patient had been accustomed by his prior pneumothorax to breathe with only one lung. The authors think that while the establishment of artificial pneumothorax is not indispensable in such cases, it is useful for the avoidance of the dangers of sudden pneumothorax during operation, although of course such total pneumothorax can be prevented in the course of operation.

Nevertheless in pleuropulmonary surgery artificial pneumothorax will find numerous indications, as in cases analogous to this.

W. A. BROWN.

Jaugens, F. Two Cases of Mediastinal Tumor Treated by Radiotherapy (*Deux cas de tumeurs médiastinales traitées par la radiothérapie*) *J de radiol t d'électrol* 9 6 li 9

Radiotherapy is the only treatment applicable to intrathoracic tumors in which on account of their volume or their localization surgical intervention is either impossible or dangerous. The situation of such tumors in a region normally very permeable to the X rays deprived of organs susceptible of being altered by repeated irradiations and allowing multiple ways of access give very favorable conditions from a technical viewpoint and permit the administration of therapeutic doses and the attainment of the limits of sensibility in the elements of the neoplasm.

The author reports the clinical data of two cases. In one a woman of 6 irradiation was begun in January 1911 so that the anterior and posterior faces of the thorax were alternately exposed to weekly treatments. The dosage was 5 H penetrability 8 B altered through a millimeter of aluminum. After seventeen treatments the woman who had been previously in a very prostrate condition had recovered sufficiently to travel to Switzerland for recuperation. On her return she had seventeen more treatments and the author reports that all objective symptoms have disappeared. He points out that while the prognosis of her condition early in 1911 was fatal in December 1915 her very satisfactory state is a very happy result of radiotherapy.

In the second case treated a child of 14 the results while not so satisfactory as in the first case still show a great amelioration. There is no notable diminution in the size of the tumor but the activity of the neoplastic elements has been checked and there is a suppression of the toxic products due to it which has brought about considerable improvement in the general condition so that the child is returned to normal health. W. A. BRENNAN

HEART AND VASCULAR SYSTEM

Ascoli and Masserini. Projectile in the Right Lobe of the Heart After Trauma of the Cava Inferiore (*Proiettile entro l'orecchietta destra del cuore pervenuto attraverso la cava inferiore*) *Cl. Ch.* 9 6 xi 377

Preliminary radiocopy of the patient reported showed a piece of shrapnel on the projection of the left iliac wing about the middle point. A second radiocopy made one month later showed the projectile in the cardiac circuit.

It was about 1 to 8 mm in diameter inside the right lobe and it moved its position rhythmically with the movements of the lobe. Although the authors judging from published cases think that operative treatment appears to offer the only ultimate hope in such a case yet they hesitated to operate in this case on account of the patient's condition.

W. A. BRENNAN

Bichat: Extraction of a Piece of Shell from the Right Ventricle (*Extraction d'un éclat d'obus du ventricule droit*) *Bull. et m. Soc. d'ch. d. Par.* 1916 xlii oo

Bichat reports the case of a soldier wounded in the neighborhood of the right lung. Radioscopy showed a foreign body in the left part of the thorax at the external and lower limit of the shadow of the pericardium and heart which followed the movements of the heart and respiration. Later examinations localized this body in the pericardium situated behind the sixth rib.

Operation performed two weeks later under chloroform consisted in incision over the sixth rib, resection of the rib, longitudinal incision of the pericardium which was found empty. The projectile was felt embedded in the lower extremity of the right ventricle. The ventricle was caught between two fingers and pulled forward incised and the piece of shell removed by forceps. Some black blood escaped but a few catgut sutures produced hemostasis. The pericardium was sutured.

There was no acceleration in the heart movements which remained at 80 until the end of the operation. The projectile weighed more than 3 gr and was 16 mm long. The condition appeared to progress satisfactorily for more than a week. On the thirteenth day after operation signs of pericarditis appeared the circuit was opened and a quantity of seropurulent fluid drawn off but ten days later there was sudden aphasia. Cheyne Stokes respiration was followed by death in a few hours.

At autopsy the lung wound was shown to be uncinatized, the trajectory contained a small fragment of bone with abundant suppuration. Bichat believes that the pericardic infection originated in the intrapulmonary infection.

This is the fourth published case of extraction of a foreign body from the heart since the war began. In only one of these cases was there a recovery. From a consideration of the general literature of the subject the author concludes that projectiles in the heart, excluding the pericardium are not well tolerated and that operative intervention has given better results on the whole than non interference and that the subject opens up a new chapter in war surgery.

W. A. BRENNAN

PHARYNX AND ESOPHAGUS

Guttman J. and Held T. W.: Carcinoma of the Esophagus Perforating Into the Right Bronchus. *M. d. Rec.* 9 6 lxv 039

The author reports a case the interesting features of which are as follows:

The onset of the disease appeared to be at the end of September 1915 four months before the patient's death. The primary cause of the death, carcinoma of the esophagus, had probably existed for a long time without giving practically any symptoms whatever. There was no dysphagia, no vomiting, no fetor ex ore etc. up to within a short period before

his death. A fistulous communication between the esophagus and bronchus had existed for some time. As a result of this, food particles passed from the former into the latter and in the course of time gave rise to bronchiectasis.

The patient was sixty years of age and had suffered from digestive disturbances for ten years. The bronchiectasis gave rise to small pulmonary hemorrhages and to cough thus obscuring the clinical picture by simulating tuberculosis.

The absence of pain and the comparative euphoria at a fever temperature of 100 and 102 is interesting.

The choking and coughing spells when the patient attempted to drink is one of the most characteristic symptoms of esophagobronchial communication.

EDWARD L. CORRELL.

SURGERY OF THE ABDOMEN

ABDOMINAL WALL AND PERITONEUM

Outland, J. H. and Glendening, L. Chylous Ascites and Chylothorax Due to Carcinoma of the Stomach. *J. Am. M. Ass.* 96 April 1835.

A man, 46 years of age, felt well up to six months before examination April 16, 1915. The onset of his illness was sudden. He had a sudden attack of dizziness and vomiting. He did not go to bed, but was weak and dizzy and continued to feel much the same way for two months. He never vomited blood. For three months previous he had been troubled with indigestion, pain after meals, belching and bloating. The bowels were constipated.

March 27, 1915 the abdomen began to swell very suddenly and in a few days was enormously distended. It was tapped April 21 and about a gallon of milky fluid was removed. April 28th it was tapped again and 2.5 gallons of asdific fluid of the same character removed.

April 27th the abdomen was tapped and over a gallon of milky fluid withdrawn. The chest was aspirated at the same time, three and a half quarts of clear straw colored fluid being removed. The fluid removed from the abdomen was milky in appearance, with a tinge of pink. It contained 90 per cent of albumin and fat and did not react to Fehling's solution. Microscopically it showed small fat globules and small specks in constant stomatic motion. Leucocytes and erythrocytes were numerous. The patient died May 31st.

When the abdomen was opened at autopsy about three quarts of milky fluid escaped. The intestines were distended and covered with a lymphatic exudate. The cecum and appendix were enormously distended. Small lymphatic channels over the surface of the intestine were greatly distended. All the glands of the mesentery were enlarged. The entire mesentery was a thick mass of glands which were soft in consistency. The liver was enlarged and oedematous. The gall-bladder was large. There were no gall stones. A tumor was present along the lesser curvature of the stomach, extending from the duodenum to well within the pylorus. The glands of the gastrophrenic mesentery were enlarged. No growth was found in the rectum.

EDWARD L. CORRELL.

Tuley H. E., and Graess, S. Chylothorax, Chylous Ascites, and Lymphosarcoma. *J. Am. M. Ass.* 96 April 1844.

A woman, aged 58, married 36 years with two children living, had five brothers and sisters, of whom one died of brain fever, one of typhoid fever and one of pneumonia, those living being in good condition. The menopause occurred seven years previous without complications. The patient had always been robust, the normal weight being 160 pounds. For several months she complained of pain in the scapular regions of both sides and could not lie on her back. For a year she had had pain and fullness in the epigastrium after eating.

The author first saw the patient October 4, 1915, for an attack of dyspnoea, the cause of which seemed apparent as the chest was full of mucus and sibilant rales and the breathing was typical of asthma.

November 2 a careful examination was made of the thorax and the presence of fluid diagnosed in the left pleural cavity. A peculiar feature of the chest findings at this time was the presence of bronchial breathing on the entire left lung, a tender and posterior with tense flatness over the left base. November 2 a thoracentesis was done through the eighth interspace and three pints of thin, milky white fluid were withdrawn. The appearance was that of pus, but an examination showed it to be free from cells and to be sterile chylous fluid. The relief from the dyspnoea was almost immediate there being very little cough following the aspiration. From then until March the total quantity of chylous fluid removed from this patient's chest was 48.5 pints.

At autopsy the head of the pancreas was involved in a tumor as described below. The tail was negative.

The lymph nodes from the neck of the pelvis, especially those lying in the posterior mediastinal and retroperitoneal spaces, were involved in an apparently primary neoplasm which was growing around the structures in those regions, but it did not infiltrate any except the head of the pancreas. The cervical, axillary, supraclavicular and infraclavicular and bronchial nodes varied in size the largest being about 1 cm. in its greatest diameter were encapsulated and moderately firm and on section pale flesh color and homogeneous except the last which were speckled with black. The posterior

mediastinal nodes were much larger reaching a maximum diameter of 4 cm but were encapsulated and sifter and paler on section. Below the level of the diaphragm the nodes seemed conglomerate in a mass larger than one fist and involved the head of the pancreas. On section this tissue was most pale homogeneous and typically like fish flesh while scattered in it could be seen lobules of pancreatic tissue. The lymph nodes along the lesser curvature of the stomach in the gastrohepatic omentum and retroperitoneal along the aorta were enlarged (those in the gastrohepatic omentum reaching a diameter of 4 cm while those about the abdominal aorta decreased in size to the region of the bifurcation where they measured about 2 cm in diameter but were of the same appearance as those described above.

In situ structures about the innominate veins were dissected primary incision being extended at right angles laterally along the left clavicle. No abnormality or rupture of the thoracic duct could be found. In the posterior mediastinum duct the esophagus and vessels were surrounded by the tumor but none of these structures were invaded macroscopically. The heart lungs trachea, esophagus aorta thoracic duct pancreas kidneys and suprarenals were removed en masse. The duct was slit open and followed to its beginning branches. Its mucosa was smooth everywhere.

The microscopic diagnosis was lymphoblastoma malignant lymphosarcoma round-cell sarcoma.

The final diagnoses were lymphoblastoma of the cervical axillary clavicular mediastinal gastrohepatic abdomino-aortic and iliac lymph nodes invading the pancreas and lung compressing other structures adjacent to them and metastasizing in the spleen chylothorax bilateral chyloous ascites gastric ulcers hemorrhage into the intestine chronic endocarditis chronic aortitis oedema of the legs fibrous pleural adhesions bilateral superficial ecchymoses a urticaria of the left leg multiple leiomyomata of the uterus senile ovaries post mortem change in the suprarenals chronic gingivitis atelectasis of the lungs.

EDWARD L. CORVELL.

Chatillon F Spontaneous Pelvic Peritonization
in Women La peritonisation spontanée du bassin
de la femme. *J gynéc et obst* 1916 xlii,
46

Several authors have from time to time shown that certain organs such as the epiploon colon etc. can among themselves form a protecting tent over the lower pelvis destined to prevent the spread of suppurative processes into the abdominal cavity.

From a study based on twenty-seven observations made by Beuttner in the Gynecological Clinic of the University of Geneva in which he studied the exact condition in which the abdomen was found on making a laparotomy he sketched certain conclusions which he recently published. Chatillon now publishes this study on the same lines based on a much larger number of cases viz 100.

Sometimes at a laparotomy the inflamed genital organs are found to be so well protected by their neighbors that they are scarcely seen the inflammatory process has been spontaneously peritonized and the diseased parts isolated from the abdominal cavity hindering propagation of the infection. The object of the author's research is therefore to find if there are any rules according to which the different organs act toward each other or how one or several diseased organs are protected by their neighbors.

The author considers this spontaneous peritonization by means of the rectum sigmoid caecum small intestine epiploon etc. He holds that spontaneous peritonization has been produced in 100 cases as follows:

21 times by 1 organ
30 times by 2 organs
26 times by 3 organs
11 times by 4 organs
5 times by 5 organs
5 times by 6 organs

While Bliessner found that the grand epiploon and small intestine were the organs most often utilized the author's research showed that the small intestine and sigmoid were the most frequent. He draws these general conclusions from his study.

1 The annexes descend into Douglas's pouch along the posterior wall of the uterus and are peritonized by adhesions which the rectum, uterus bladder etc. form around them. In this case the peritonization will be effected by the organs of the lower pelvis. It will be low peritonization.

2 If the annexes for any reason do not descend into Douglas's pouch and consequently remain in good position peritonization will be effected by the organs situated above them or in their immediate vicinity i.e. the epiploon caecum sigmoid loop or small intestine. This process the author designates as high peritonization.

3 The combination of these two methods will form a third category which comprises complicated cases where peritonization proceeds at the same time on the part of all the organs. This may be termed mixed peritonization.

Hence the general rules for spontaneous peritonization of the pelvis in woman are: (1) by means of the lower pelvic organs (2) by means of the organs of the intestinal tract (3) simultaneously by the lower pelvic organs and those of the intestinal tract.

W. A. BREWSTER.

Beach W M Some Observations on Hernia in Relation to Intestinal Stasis. *The Practitioner* Dec 1906 90 June

After reviewing the theories of Keith relative to nodal zones situated at different levels in the intestinal musculature the author makes the following observations:

1 We have tried to define intestinal stasis as a physiological or anatomical disturbance of peristalsis by an inhibiting influence through the nodal zones of

the myenterium located in the esophagogastric junction, the duodenojejunal area, the ileocecal region, and the rectum. This demonstrated in the laboratory must be verified clinically.

2. Anatomic distortions, as kinks, adhesions, ptoses, etc. lead to stasis by disturbing the ganglia controlling peristalsis.

3. Hernia is a frequent manifestation of visceral displacement concomitant with stasis.

4. Long truss wearing with great pressure tends to produce rectal disease.

GASTRO-INTESTINAL TRACT

Terry W I and Kilgore, A. R. Congenital Stenosis of the Duodenum in an Adult. *J Am Med Ass* 9 6 1914, 774.

A man aged 24, presented essentially equal to family and past history and habits. His illness began at the age of 2 with years of intermittent rather indefinite pain in the lower abdomen followed by three and a half years of freedom and then four years more of similar attacks at intervals of from three to six weeks. The pain was always below the umbilicus, extending 5 cm to either side of the midline without radiation. There was no definite relation to food. It was relieved by hot drinks and occasionally by defecation. It was usually worse at night.

He had had a definite pain for six years but four years ago vomiting had begun and had grown progressively worse, usually coming after the evening meal, sometimes after other meals. There had never been hematemesis or melena.

The abdomen was scaphoid except for prominence about the umbilicus (distended stomach) over which there was marked peristalsis from left to right. The lower border of the stomach was seen and percussed midway between the umbilicus and the symphysis.

At operation the stomach was found to be much dilated and lying in the abdomen. There were some old adhesions across both the anterior and the posterior aspects of the stomach toward the pylorus but none about the duodenum except two very thin strands between the pylorus and gall bladder. The pyloric ring was much dilated. The first portion of the duodenum was dilated the upper portion forming a definite pouch. Just distal to this dilated portion at about the junction of the first and second portions of the duodenum and above the entrance of the common duct the intestine was evenly constricted to one-third or less of its normal diameter for about 5 cm. There was no thickening of the wall and no scars could be found. No abnormalities of the peritoneum to account for the constriction.

A posterior gastro-enterostomy was done and while the stomach was cut into marked thickening of the wall was noted in spite of the dilatation of the organ, indicating long-standing obstruction.

The patient vomited during the first forty-eight

hours following the operation the vomitus containing considerable blood. Following this he was desirous much of the time and on this account was given occasional nasal feedings. On the fifth day he was apparently much improved and took considerable nourishment but vomited small amounts twice during the afternoon. Quite suddenly in the evening the pulse rate increased and respirations became shallow and rapid and he gradually sank into coma and died six hours.

At necropsy there was found to be marked dilatation of the stomach with partial breaking down of the gastro-enterostomy wound leakage of stomach contents into the peritoneal cavity and beginning peritonitis. The constriction of the duodenum presented the appearance of an obstructing fold of the duodenal wall rather than of a narrow tube 5 mm long as it had appeared before fixation. Grossly and microscopically the constriction was covered with normal mucous membrane and careful search failed to reveal any scar tissue or other evidence of old ulceration. EDWARD L. CORCORAN.

Cooke, J V, Rodenbaugh, F H and Whipple G H. Intestinal Obstruction: a Study of Non-coagulable Nitrogen in the Blood. *J Exp Med* 9 6 1914, 7.

This communication deals with analyses of the blood in intestinal obstruction, intestinal closed loops, and other acute intoxications. The tables give figures for non-coagulable nitrogen, urea nitrogen and in some instances the total nitrogen partition in the blood. The authors interest in this study of the blood was aroused by a communication of Tilden and Comfort who in a large series of human cases reported three cases of intestinal obstruction with very high non-coagulable nitrogen. Since that time they have studied the blood of various animals which were being observed in connection with other experimental work.

They found that most cases of intestinal obstruction especially with signs of acute intoxication showed high non-coagulable blood nitrogen and it seemed to them that this factor might be of value in diagnosis and especially prognosis of acute abdominal conditions. They believe that this non-coagulable nitrogen determination is of value in various acute intoxications. If the reading is high, may assume a dangerous grade of intoxication, but on the contrary it may not assume that a low reading gives evidence of slight intoxication, because a fatal outcome may be associated with a low reading. It is of considerable value to know that the non-coagulable nitrogen of the blood may show high readings in other conditions besides renal disease.

On the other hand, determinations of the blood urea alone are of somewhat less value in studying the retention products in the blood in these conditions. In their experimental animals the blood urea has varied from less than 30 per cent to more than 80 per cent of the total non-coagulable nitrogen, and,

while a high urea reading is the rule the variations in the urea curve and the curves of the other non-coagulable nitrogenous substances are so great that the urea reading is a somewhat unreliable index of the extent to which non-coagulable nitrogenous substances have accumulated. The authors work seems to establish the following facts:

1. Intestinal obstruction as a rule is associated with an increasing amount of non-coagulable nitrogen in the blood. With acute intoxication the rise in non-coagulable nitrogen may be rapid and reach as high as three or even ten times the normal amount. With more chronic intoxication there may be little or no rise in the blood non-coagulable nitrogen. Closed intestinal loops show exactly the same picture and when combined with obstruction may give very high nitrogen readings.

2. Acute proteose intoxication due to injection of a pure proteose will show a prompt rise in blood non-coagulable nitrogen even an increase of 100 per cent within three or four hours. These intoxications also show a high blood content of creatinin and urea. The residual or undetermined nitrogen may be very high.

3. A human case of intestinal obstruction with autopsy presents blood findings exactly similar to those observed in many animal experiments. Clinically the non-coagulable nitrogen of the blood may give information of value in intestinal obstruction. A high reading means a grave intoxication but a low reading may be observed in some fatal cases and gives no assurance that a fatal intoxication may not supervene. The kidneys in practically all these experiments are normal in all respects.

It is possible that protein or tissue destruction rather than impaired eliminative function is responsible for the rise in non-coagulable nitrogen of the blood in these acute intoxications. Transfusions of dextrose solutions often benefit intestinal obstructions and may depress the level of the non-coagulable nitrogen in the blood. Some cases show no change in non-coagulable nitrogen following transfusions and diuretics, and as a rule such cases present the most severe intoxication.

GEORGE E. BRIDY

Power D.: A Clinical Lecture on Volvulus. *Am. J. S. G.* 916 xxx 78

Power defines volvulus and states that the exact mechanism of its production is unknown but that two necessary factors are (1) congenital or acquired defect in the intestinal attachment allowing free mobility and (2) a condition producing an artificial pedicle. He cites seven cases from which he concludes that volvulus is one of the causes of acute intestinal obstruction and that it may appear in newborn children although this is rare. He believes that volvulus requires for its production a loop of bowel lying less securely packed than usual in the abdominal cavity, a loaded bowel and irregular peristalsis. Frequently there is a twist of one or two turns in the loop upon itself usually the mesentery is long in these cases.

The onset of volvulus is sudden and painful and occurs in persons who have had no reason to believe they were not in their ordinary health; it may occur without any known cause or it may follow an injury to the abdomen. Generally the pain is persistent or is characterized by exacerbation. The position of the volvulus determines the time of the appearance of the signs of intestinal obstruction. When the sigmoid is involved the signs appear early when the caecum is twisted there may be a delay till the larger intestine has emptied itself or it may be masked by a discharge of flatus generated in the great bowel. The onset of vomiting may be delayed or in some cases may be entirely absent but usually it is a marked feature of the condition. At first the temperature and pulse are not altered.

Abdominal distention is limited early to the portion of bowel involved. In its inception there is no rigidity of the abdominal wall, local tenderness over the actual seat of the volvulus is present but is not very marked until the onset of peritonitis.

Strangulated hernia, acute perforation of the stomach or duodenum, biliary and renal colic, acute intestinal obstruction due to strangulation by a band, hamorrhagic pancreatitis, thrombosis and embolism of the mesenteric vessels and appendicitis must each and all be considered in the diagnosis.

The prognosis at the present time is extremely unfavorable, the improvement in this regard depends entirely upon the early recognition and early operation. In looking up the records in his hospital from 1899 to 1915 the author finds that there were 25 cases of volvulus, 14 men and 11 women. Twen-

ty-one of these patients died. In the after treatment of volvulus the author believes that nothing should be given by mouth for the first twelve hours after the operation though the mouth may be rinsed out with warm water from time to time if thirst is distressing. Three or four doses of purgative extract may be given hourly by injecting 0.5 to 1 ccm into the muscles, in the hope of causing contraction of the involuntary muscles of the body, thereby stimulating the unstriated muscles of the intestine. The rectal tube should be passed every four hours if the distention is very great.

In general the after treatment is directed toward the reduction in the tympanites as he recognizes that the tympanites is a measure of intestinal paresis and that as this is reduced the patient will improve. EAST C. ROBERTS.

Abbott A. W.: The Early Diagnosis of Intussusception in Children Under Three Years of Age. *J. La et G. N. Y.* 39

The author gives a series of statistical observations made upon twelve cases of intussusception in infants under three years of age. The diagnosis was made before operation in all but two and the intussusception was found to be fecocolic in all cases.

In 100 per cent of the cases the attack began by a sudden violent abdominal pain accompanied by re-

gurgitation of stomach contents the child being otherwise well. This pain is recurrent varies in intensity but is regular in periodicity. With the pain the child assumes peculiar positions, generally prone. In 5 per cent of the cases, collapse quickly occurred and the pains were then merely indicated by moans and drawing up of the limbs.

In 93 per cent an abdominal tumor could be made out in the course of the colon.

In 9 per cent there were 0 faces in the stools. In 83 per cent of these mucus was the chief constituent of the stools. In 77 per cent of the cases, blood was present in the stools only after the second day.

In nearly all cases the abdomen was not distended, flaccid, and scaphoid.

In exceptional cases vomiting was absent and in 81 per cent of the series it only occurred after the second day.

Positive identification of the intussusception by rectal examination is pathognomonic and was demonstrated in only 55 per cent of the cases.

The virulence of the disease and its mortality depend not so much upon the time elapsing before operation as upon the intensity of the strangulation of the mesenteric circulation. However the earliest possible diagnosis and immediate operation is imperative.

In the series, 8 recovered and 4 died. In those in which collapse quickly followed the onset all died. While in those in which collapse was absent 8 recovered and one died. P. M. CHASE

Sweet, J. E., Peet, M. M., and Hendrix, B. M.
High Intestinal Stenosis. *Ann Surg Phila* 9 6
1911, 730

The authors carried out a series of experiments to determine the cause of death in high intestinal obstruction, the clinical picture of which suggests grave constitutional disturbance of toxic nature. Draper's idea that the toxin is a normal product of the duodenum which under normal conditions is neutralized or detoxified by the junction is supported. The authors began with the admitted clinical fact that the symptoms of acute pancreatitis and acute high obstruction are so much alike, if not identical, that a differential diagnosis can be made only at operation and this suggested that the fatal agent might in some way be connected with the pancreatic juice.

It is believed that high intestinal obstruction is due to the highly toxic properties that have been found in the proteose stage of protein digestion. The normal ferments of the stomach and the normal ferments of the pancreas break a protein down to this stage normally. It is supposed that the gastric digestion carries the proteins of the food to the peptone stage, from which the digestion is carried to the amino-acid stage by the ferments of the pancreas and the intestine. The intestinal juice is not supposed to contain any proteolytic ferment except the ferment erepsin which can digest the pro-

tein casein, but no others, while its chief function is to digest the proteoses to the amino-acids. But either gastric or pancreatic ferment is capable of producing a toxic proteose. In addition, many bacteria can digest the protein building-stones to the highly toxic amine compounds. Further the substance fecitbin can, by the action of the fat splitting ferment lipase be broken down with the formation of the choline bases, some of which such as choline and neurine, are highly toxic.

Whipple has demonstrated that the toxic body found in their high loops is a proteose and that this purified proteose would exactly reproduce the symptoms of high obstruction when injected into a normal animal.

Two outstanding features of the authors' experimental work are (1) the added demonstration of the fact that a gastro-enterostomy opening does not function in the presence of a normal pylorus (2) the explanation of the similarity between acute pancreatitis and acute high obstruction: they are alike because they are both essentially the same thing—an intoxication with the toxic products of protein cleavage. In pancreatitis certainly due to the proteolytic ferment of the pancreas in high obstruction not necessarily perhaps, but in their opinion in all probability the same toxin, produced by the same ferment. In pancreatitis the escape of the products of the digestion of the pancreas into the tissue permits the intoxication. In obstruction the conditions of obstruction permit the absorption of toxic products, which under normal conditions would either not be formed, or if formed, would be immediately broken down to non-toxic products.

The authors refer to the failure to find any definite poison in conditions of stasis of the large intestine and draw attention to the fact that in stools of the colon the head of the pancreas is dragged across the transverse colon, producing as has been reported a dilated duodenum. Removal of the colon would relieve this drag and the authors predict the idea that it would be well to consider the chronic absorption of such a poison.

C. G. HERTZ

Fowler, R. H. Complete Congenital Atresia of the Ileum. *Med Rec* 9 6 1911 39.

The author reports the case of a baby whose delivery was normal and easy, no fears being used the weight at birth being about seven pounds. Vomiting commenced about fifteen minutes after birth. The vomitus was green, frothy and thick without special odor. The vomiting continued at intervals during the night and the following day. The abdomen was slightly distended and tense. There was no visible peristalsis and no masses were seen or felt. There were no external congenital anomalies. The rectum easily admitted the little finger, no blood escaped or appeared on the gloved finger. No masses or obstruction were felt. The genitalia were normal.

At operation a right rectus incision was made.

A large amount of thin serous fluid escaped on opening the peritoneum. The small intestine presented. It was of dark color and distended six times the diameter of the neighboring loops. This distended loop of gut literally popped into the wound. It was blind and free without fibrous cord connection. The mesentery down to its root was also lacking at this point. The gut above this point was less dilated than the blind pouch. The bladder was full and the stomach distended. No stenosis or change in the pylorus was noted. The duodenum was dilated slightly more than the commencing jejunum. In a hurried search the lower end of the ileum was not found. The appendix was normal. There was no persistence of the embryonal type of cecum. The latter was firmly attached to the posterior abdominal wall. The intestines were moderately congested. The upper free end of the small intestine was sutured to the abdominal wall and the abdominal wall closed in layers about the protruding gut. Enterostomy was then performed by the thermocautery. The patient died five days later.

At autopsy it was found that the total length of the small intestine was 56 inches. The ileum ended in a small blind pouch 23 5 inches from the ileocecal valve one half inch in diameter. The wall of this was thickened and bulbous for a distance of three-eighths of an inch. It was slightly curled upon itself. The segment distal to this cul-de-sac was patent. There was a defect in the mesentery at a point opposite the atresia of the ileum. The upper blind pouch ended at a point 33 5 inches from the pylorus. It was very much dilated for a distance of six inches. The widest diameter of this portion was 1 75 inches. The duodenum had no mesentery. The cecum was located in the right iliac fossa; there fore rotation of the intestine had occurred. The ileocecal valve and the pyloric sphincter showed no change. The liver, gall bladder and ducts and stomach were apparently normal. There was an accessory spleen.

EDWARD L. CORNELL.

Huggins, R. R.: Absence of Muscular Tone an Important Etiological Factor in Post-operative Ileus. *Tr Am Ass Obst & Gynec* Indianapolis 19 6 Sept.

Distention and stasis, to a varying degree follow most laparotomies. This is usually considered a temporary paralysis a reflex action through the plexus of Auerbach and Meissner as a result of manipulation and trauma to the visceral peritoneum. Aside from the paralysis accompanying peritonitis there are occasional cases where infection can be excluded in which the patients die from paralytic ileus. This may occur when least expected and where there has been very little intra abdominal exposure and manipulation. The comparative frequency with which it has occurred with vaginal hysterectomy is significant because there is very little exposure and handling of intestines in this procedure. Careful pre-operative operative and

post-operative treatment is important in lessening post-operative paresis, but occasionally in spite of this an aggravated form of the above condition occurs and death ensues after exhaustion of all known methods of relief. When there is evidence of chronic fatigue with poor muscle tone after chronic infection or long continued strain there is always greater difficulty in dealing with this post-operative distention. The author believes that in certain instances where death occurs from so-called paralytic ileus, it is primarily due to lack of muscular strength in the walls of the stomach and intestines. As a result of observation of various degrees of distention in routine abdominal surgery we find that this depends largely on the general muscular tone in the individual previous to operation and the amount of exhaustion incident to the operative procedure and the effects of the anesthetic.

Keith has recently called attention to the presence of nodal tissue in the bowel similar to that in the heart. This is located at various points in the intestinal tract and acts as pacemaker for that particular portion. It is neuromuscular in character and suggests the intimate relation that exists between the muscular and nervous system, and the disturbances that may arise if either is below the normal in efficiency. A block may occur as in the heart at any point where one rhythmical zone passes into another. Bayliss and Starling demonstrated the intrinsic beat in intestinal muscle. Magnus demonstrated that the strips beat more actively when removed from a normally fed animal than from one that was not digesting. The intestinal tract has an intrinsic tone regulated by extrinsic nerves. Tonic contraction and rhythmical peristalsis disappear when there is general bodily weakness, and when the depleted central nervous system fails to deliver the necessary tonic impulses. Post-operative distention varies in direct proportion to the strength and tone of the general muscular system. Patients with poor general muscular tone require more careful preparation and greater efforts to minimize exhaustion from anesthetic and operative effects.

Moschowitz, E.: The Pathological Diagnosis of Diseases of the Appendix. *Ann Surg Phil*, 1916 1111 697

Moschowitz believes that in 90 per cent of cases the diagnosis of a present or previous appendicitis may be easily recognized by the naked eye. He holds that the conventional method of longitudinally slitting the organ to see if the appendix is diseased and to what extent is wrong. In acute appendicitis the longitudinal method is not so apt to lead to mistakes. The author advises simple transverse incisions made at various levels. By such incisions it is possible to tell accurately the quantity and topography of the exudate, the width and conformation of the lumen and the evidence of a lumen, the relation of the mucosa to the muscularis. Emphasis is placed upon the observation that a local peri-

tonitis is always present in the early stages of disease, and that the absence, even grossly, of a localized appendicular peritonitis practically excludes an acute appendicitis. Acute perforations are, in the opinion of the author, due to the direct destructive action of the bacteria upon the wall of the appendix associated with extensive tension upon the exudate within the lumen. Thrombosis of the mesenteric lumen plays a small part in the etiology of perforations.

The pathological anatomy of acute appendicitis is summarized as follows: (1) The infection is always enterogenic as evidenced by the invariable origin of the lesion from the mucosa. (2) The lesion of acute appendicitis is not a catarrhal inflammation as understood in the pathological sense. (3) The infection starts in the crypts of the mucous membrane. Additional weight is lent to this contention by the fact that approximately nine-tenths of the lesions of acute appendicitis occur at the tip of the appendix where stagnation is most apt to occur. This fact makes untenable the contention that appendicitis is occasionally due to a caecitis or lesions of the so-called Gerlach's valve by interfering with the drainage of the organ. (4) The pathological lesion fairly corresponds to the duration of the illness. (5) The essential pathological lesion of acute appendicitis is a membranous inflammation, a so-called diphtheritic inflammation.

In healing appendicitis the course of events is as follows: The exudate or membrane breaks down, becomes necrotic, and leaves an ulcer which gives birth to granulation tissue. The extent of this granulation tissue depends upon the extent of the destruction of the mucosa. If the mucosa has been completely destroyed, no regeneration of epithelium is possible and the ensuing organization of the tissue results in complete obliteration. If the mucosa has not been completely destroyed, the epithelial lumen is restored, a stricture is formed the size of which is obviously in inverse ratio to the extent of the mucosal destruction. At the same time the formation of new connective tissue in the muscular coats leads to the changes of deformity and separation of the fibers by newly formed connective tissue. In the peritoneal coat the formation of the new connective tissue and destruction of the surface epithelium also lead to two changes: thickening and formation of adhesions. The histological characteristics of a healed or chronic appendicitis are therefore the following: (1) a narrow lumen (stricture) (2) complete obliteration of the lumen by new connective tissue (3) the absence of mucosal crypts. (This absence indicates, except in cases where the lumen

of the appendix has been dilated from other causes, that a previous acute suppurative inflammation has taken place. This phenomenon is important in differential diagnosis in cases where there is question as to whether the lumen of the appendix is narrower than normal.) (4) the widening of the submucous connective-tissue zone (5) the attenuation and diminution (or even complete disappearance) of the lymphoid tissue (6) the infiltration of

the muscular coats by new connective tissue and consequent deformity (7) the thickening, increased density and deformity of the peritoneal coat.

As a result of the author's observations it is stated that an acute appendicitis always gives rise to permanent pathological changes and secondly that a normal appendix never has been the seat of an acute attack. Of the diagnostic characters of healed or chronic appendicitis great emphasis is laid upon (1) stricture (2) obliteration, (3) disappearance of crypts (4) widening of submucosa. The appearance of petechial spots scattered throughout the mucosa is considered to be due to operative trauma. Diverticulism of the appendix has always been associated with but inflammation.

In regard to carcinoma of the appendix the author calls attention to certain curious features of the disease. Carcinoma of the appendix differs from carcinoma of other organs and especially of the intestinal tract in number of features: (1) It occurs as a rule in the younger individuals, most commonly in the second and third decades. Two of the author's cases exemplify this. (2) Carcinoma of the appendix, both pathologically and clinically, is of very low grade of malignancy. Appendix carcinoma resembles other carcinomas only in the histological structure and the epithelial type of cell. In other respects they differ histologically from other carcinomas. The cells are smaller and less atypical, the nuclei show little variation in size and shape and are less rich in chromatin, and comparatively free from mitotic figures. Finally there is less tendency to invasion of neighboring organic structures and practically no tendency to metastasis. Indeed the author finds these pathological data brought out by clinical experience. Carcinoma of the appendix has by far the best prognosis of any cancer in the human frame. The author believes the reports of fatal cases are rare. Perhaps one of the reasons for the favorable prognosis is the early diagnosis of appendicular pain, due to the prompt interference with the drainage of the narrow lumen of the organ by the growth of the tumor. (3) The vast majority of carcinomas of the appendix are of the solid type, whereas carcinomas of the intestine are of the glandular type.

After a consideration of the subject as a whole the author arrives at the following conclusions:

1. The pathological lesion of acute appendicitis represents a suppurative process from the very beginning. The earliest lesion is a pathognomonic as the primary lesion of typhoid and all the subsequent stages of the disease within the organ are directly traceable to the spread and development of this lesion. There is no pathological evidence that an acute catarrhal inflammation of the appendix occurs.

The changes associated under the name chronic appendicitis (stricture, obliteration, etc.) are pathogenetically the healed products of the acute lesion. According to this interpretation, chronic appendicitis is not a continuous progressive

inflammation, but an end product. There is no pathological evidence of "involution" of the appendix, or of chronic catarrhal inflammation of the appendix.

3 The only justifiable classification of inflammation of the appendix, therefore is the following: (1) Acute appendicitis. (2) Healing of subacute appendicitis. (3) Healed or chronic appendicitis. (4) An acute localized peritonitis with the formation of fibrin and limited to the site of the lesion is always present in acute appendicitis as early as twelve hours after the onset (and perhaps earlier) so that the absence grossly of a localized peritonitis in suspected cases, is *eo ipso* evidence of absence of acute appendicitis. (5) In addition to obliteration and stricture, attention is called to two new easily recognizable, constant, and pathognomonic signs of chronic appendicitis namely: (a) absence of mucosal crypts (b) marked widening of the submucous connective tissue zone. The latter sign is especially easy to determine upon cross-section of the organ, and is recommended as the simplest way to determine the presence or absence of a chronic appendicitis. (6) Cross-section of the appendix at various levels is far preferable to longitudinal section to determine pathological changes.

C. G. HERR

Valdez, G.: Morphine as an Early Diagnostic Element in Certain Forms of Acute Appendicitis (*La morfina como elemento de diagnóstico precoz en ciertas formas de apendicitis aguda*) *Pres. méd. Argent.* 19 6 14, 430.

Valdez uses morphine in the diagnosis of various acute abdominal processes especially in those of an appendicular nature believing that this method may be applied in those cases in which the diagnosis is doubtful. In effect by making an injection of morphine in such cases the reflex defensive phenomena disappear (contracture of the abdominal muscles) which allows a much better abdominal examination, as at the end of an hour after the injection the pain can be localized with great exactness.

Valdez thinks that morphine can be usefully employed in some cases of difficult diagnosis.

W. A. BUCKMAN

Robinson, J. E.: The Leucocyte Count of Appendicitis. *N. Y. M. J.* 19 6 173

A report is given of 200 appendices removed at operation at the King's Daughters Hospital Temple Texas, in the last two years in which sections were made of the appendices and records made of the blood-counts only blood-counts made before operation being considered.

Reports are also given of the blood-counts in 200 cases in which records were kept of the blood counts but no sections made of the appendix.

Fifty two cases, or 21 per cent were diagnosed as active inflammatory by both the surgeon and the pathologist the average leucocyte count being 18 000 and the polymorphonuclears 82 8 per cent

Sixty five cases, or 32 5 per cent were diagnosed as chronic by both the surgeon and the pathologist the average leucocyte count being 10 161 and the polymorphonuclears 76 per cent.

In 40 cases, or 20 per cent the appendices were removed while operations were being performed for non inflammatory conditions in the abdomen. In these cases which both the surgeon and the pathologist reported normal the average leucocyte count was 8,400 and polymorphonuclears 67 5 per cent.

It will be seen that the surgeon's report made with the history and appendix before him corresponded with the laboratory report 157 times or in 78 5 per cent of the cases.

Fourteen cases were diagnosed as active appendicitis by the surgeon and as normal by the pathologist and in these cases the average leucocyte count was 11 900 and polymorphonuclears 72 1 per cent.

Twenty-four cases diagnosed as chronic appendicitis by the surgeon and as normal by the pathologist gave an average leucocyte count of 8 000 and a polymorphonuclear of 65 8 per cent.

In 5 cases reported as active appendicitis by the surgeon and as chronic by the pathologist the average leucocyte count was 7,450 and the polymorphonuclears 62 5 per cent.

Presuming that the findings are correct and that the work is that of surgeons of average ability it will be seen that the surgeon is incorrect in his conception of the pathology of the appendix in 21 5 per cent of the cases. Twelve per cent of the normal appendices were diagnosed as chronically inflamed. Seven per cent of chronic cases were diagnosed as active and 2 5 per cent of normal appendices were diagnosed as acutely inflamed. There is one redeeming feature of the surgeon's report in no instance was an inflamed appendix diagnosed as normal and his efficiency along this line is easily 100 per cent.

In the second series of 200 cases in which sections were not made 93 were diagnosed as actively inflamed and 55 showed pus either in or around the appendix these gave an average leucocyte count of 20 000 and a polymorphonuclear of 84.6 per cent. The highest leucocyte count was 98,000 with 83 per cent polymorphonuclears. The lowest count was 10,000 leucocyte with 86 per cent polymorphonuclears.

Thirty-eight cases diagnosed as active appendicitis showing no pus gave an average leucocyte count of 18,000 polymorphonuclears 83 3 per cent.

Six cases in this series gave a leucocyte count as low as 12,000 with an average of 83 per cent polymorphonuclears. In 107 cases diagnosed as chronic appendicitis the average leucocyte count was 10,000, polymorphonuclears 70 2 per cent.

It will be noticed here that the cases showing pus gave a leucocyte count of 11 000 and a polymorphonuclear count of 18 per cent higher than those in the series which were sectioned and pronounced to be actively inflamed, while the cases showing no pus gave practically the same count as the series

sectioned, namely 18,000 in the sectioned series and 18,500 in the series not sectioned with a difference of only 0.4 per cent in the polymorphonuclears.

EDWARD L. CORNWELL.

Leigh S. Treatment of Suppurative Appendicitis.

South. M. J. 961:53

As soon as appendicitis is suspected, the head of the patient should be immediately elevated and the patient kept on the right side. In such position if rupture takes place, the septic fluids will either remain at the site of the appendix and become walled off or gravitate into the pelvis where they may be more safely taken care of by the serous membrane, be more conveniently reached at the time of operation, and the dangerous region of the upper abdomen will be thus safeguarded.

The question of transportation is most important, the patient's shoulders being well propped up and inclined to the right side. This must be strictly done in all carriages, wagons, trains and ambulances used for the sick. The last named should always be equipped with an elevating stretcher.

When a case of suspected suppurative appendicitis reaches the hospital, he should be immediately placed on an elevated bed, on the right side with an ice bag applied. Except in desperate cases, a low turpentine enema should be given.

The anesthetic is of major importance. The author has used nitrous oxide-oxygen in 1,000 cases, not only without mortality but without any bad effects, either direct or indirect. It is especially helpful in severe appendicitis, doing practically nothing to the abcess, producing no irritation of the lungs or kidneys, and accompanied either by no nausea or a minimum amount.

The location of the incision in cases of suspected suppurative appendicitis is important. Drainage through the old longit. diast. incision leaves a very weak spot which need by always requires operation to close. For several years the author has employed the transverse incision. The abcess is opened after walling off. The pus is drained and the appendix sought in most cases. The cavity is wiped dry and gauze rubber tube drains inserted.

In suppurative appendicitis, in which the abcess has not been walled off by adhesions, and in consequence of the general peritoneal cavity has become infected, the transverse incision must be stretched to allow free access to the peritoneal cavity. Incisions are preceded by injecting novocaine solution to produce nerve-blocking. The greatest possible gentleness is exercised in the handling of the tissues.

No irrigation should be used, but the pus should be wiped out carefully with sponges. After all the pus which is accessible is thus cleaned out pads are cautiously inserted and the appendix searched for and removed a pad being packed into the site of the appendix, which is usually quite solid. The pelvis is often found full of pus, which should be removed by suction.

EDWARD L. CORNWELL.

Shaw H. A. The Treatment of the Retrocecal Appendix. *Ann. Surg. Phila.* 961:117:5

The author refers to the simple clean, bloodless technique for the removal of retrocecal appendix by mobilization of the cecum and colon. In the etiology of a retrocecal appendix the following factors are emphasized: (1) the influence of peritoneal adhesions established during the descent of the cecum from its subhepatic position to the iliac fossa; (2) the inherent curve of the fecal pouch; (3) the unequal development of the pouch.

The author suggests the diagnostic points necessary to determine the position of aberrant appendices: careful survey of the cecum (with the embryology thereof in mind) noting the relative size and position of the terminal sacculi; its topographical peritoneal relations; careful palpation. The technique emphasizes the mobilization of the cecum and portion of the colon necessary for exposure, and after exposure separation of adhesions and delivery of the appendix. After removal of the appendix the cecum is replaced and the incision line in the peritoneum closed by sutures. The stump of the appendix is treated after the accepted manner.

C. G. HERTZ

Frazier C. H. and Post M. M. Experimental Colonic Stenosis. *Ann. Surg. Phila.* 961:117:759

The authors believed that a maximum amount of stasis without partial obstruction could be secured by a simple reversal of the large intestine and carried out their experiment by the reversal of the colon for a length of four to six inches above the sigmoid. Two sets of experiments were carried out, as follows:

With reversals of the colon *per se* the stools were soft and well formed and all the dogs gained weight. The following substances were demonstrated by qualitative tests in the urine: methylamine, trimethylamine, tetramethylamine, pentamethylamine, paroxyphenylthylamine. From the presence of the last, it was inferred that phenylethylamine was present. Methylguanidine, diamethylguanidine, and imidazoethylamine were not demonstrable. The urine of these dogs as well as the substances obtained after chemical isolation of the mixed bases was injected intravenously but no noticeable toxicity could be established; no did the curve of blood pressure differ from that to be noted following the injection of normal canine urine.

The results of reversal of the colon in dogs with Eck fistula. A heavy silk ligature was tied around the portal vein close to its entrance into the liver thus forcing all of the portal circulation into the vena cava. In these experiments the stools were well formed and no toxic symptoms were observed. The chemical examination of the urine was the same as before, both qualitatively and quantitatively, showing that the liver had not removed or changed the substance absorbed from the colon.

The authors' conclusions were that mere stagnation of feces in the colon of the dog, when in a nor-

mal mixed diet does not lead to the formation of toxic substances of note, at least in the presence of the normal flora of the canine colon.

The fact that these dogs remained in perfect health and gained in weight indicates that simple colonic stasis in the dog is harmless and certainly suggests that the dire effects attributed to colonic stasis in man are in part at least due to some other cause than the absorption of the products usually formed in simple fecal stagnation. C G HENY

McArdle J S: Alternatives to the Operation of Colotomy *Practitioner* Lond. 1916 xcvl, 578.

The after-effects of so unsurgical an operation as colotomy are very distressing to the patient. The author believes that every effort should be made to substitute some more finished procedure for this crude method and suggests that either of the four following operations should be carried out according to the conditions found on exploration.

1 The sigmoid above the stricture can be joined to the sound lower part of the rectum.

2 If the sigmoid is fixed so that it cannot be brought down the transverse colon if low may be anastomosed to the rectum and to the descending colon above the stricture.

3 If this is not feasible the caecum may be joined to the rectum and the ileum joined to the colon above the stricture.

4 The lowermost coil of the ileum may be joined to the rectum and by a lateral anastomosis to the descending colon above the obstruction.

The difficulty in all these procedures is the application of the usual suture methods because of the difficulty in commanding the rectum through an abdominal incision.

The author has devised a means whereby these operations are rendered comparatively easy. In whatever segment the upper opening is made the small female end of a Hildebrand button is inserted and fixed with a purse-string suture. By means of an especially devised forceps the larger male end is passed through the rectum and made to project upward so that a small incision may be made over the central part which then protrudes allowing the bowel wall to slide down so close to the spring that no suture is needed. The two halves of the button are then clamped. The result is a passage for fecal matter into the rectum instead of outward on the abdomen or through the lumbar region while drainage of the large intestine is possible through this route. E. K. ARMSTRONG.

Axtell W H: Acute Angulation and Flexure of the Sigmoid a Causal Factor in Epilepsy. *Tr Am Neurol Soc* Detroit 1916 Ju c.

In December 1910 the author published his first list of 31 cases, 8 private and 23 a clinic cases. In August 1911 a further report was made on 10 private cases with 3 recoveries. This included 3 additional a clinic and 2 private cases making in all 36 cases. The 3 reported cures have remained so

for a period of over four years. One additional case of the original list of 10 private cases has had no return of the convulsions since ceasing treatment two years ago. The treatment seemed at the time to increase the limitation as reported.

Since the last report Axtell has had 9 additional cases with 4 of them remaining free from seizures for from one to two and a half years making in all 45 cases reported with 8 recoveries to date.

From his observations the author is convinced that those who acquire epilepsy after the fifteenth year are more amenable to successful treatment than when the trouble commences earlier in life. In his judgment surgery can give but little relief except where there is a definite history of inflammatory adhesions holding the angulations and flexures in fact the condition of fecal stasis precludes surgery of the colon until the condition is first relieved which when so relieved eliminates a prime factor in the production of the trouble. A new and undescribed cause of the intestinal stasis which is so generally present in these cases is the separation of the recti muscles which are so essential to a thorough evacuation of the colon and for the support of the abdominal organs.

The essential failure of treatment of these conditions lies in the fact that so few recognize the true condition, and if the condition is recognized there is not sufficient persistence in relieving the condition or an ignorance as to the amount of material the colon holds and as to when it is well emptied. As the result of failure to recognize the true condition mutilating surgery is resorted to without getting results commensurate to the gravity of the surgery resorted to the first intimation of the true condition being found upon opening the abdomen then details are carried out which should have been used in the first instance and which would have rendered surgery unnecessary.

Hawley D C: Position for Sigmoidoscope Work. *Tr Am Proctol Soc* Detroit 1916 June.

A majority of writers express a preference for the knee-chest position while a minority prefer some other such as the Hanes Sims or the exaggerated lithotomy position.

Before the days of the pneumatic sigmoidoscope the position was of necessity such as would admit of inflation by atmospheric pressure. Here the knee-chest position was undoubtedly the most satisfactory.

The knee-chest position is trying and disagreeable for the patient and not easy nor always convenient for the operator. Its use is frequently attended with embarrassment and fear on the part of the patient.

With the pneumatic tube the older method may be discarded. The author favors the following method.

The patient is placed in the left lateral position with the left arm drawn out behind the back, the patient lying well over on the left chest not

stomach, the knees flexed the right more than the left and placed above and well over and beyond the left on the table and with the back concaved as much as possible. In this position the abdominal muscles are relaxed, while in the knee-chest position they are apt to be contracted. In a majority of cases the instrument may be passed easily and quickly over the brim of the pelvis and into the sigmoid colon as far as required or to its full length.

This method is not advocated exclusively but a more thorough trial is urged.

Hanes, G. S.: Some Important Pathological Conditions About the Rectal Outlet. *T. Am. P. and Sec.*, Detroit, 9 June.

Tubercular ulcerations do not occur as frequently in the mucosa of the rectum and sigmoid as is generally believed. Amoebic and various types of bacterial ulceration produce dysenteric symptoms that often lead to emaciation and exhaustion. Active tubercular ulceration is always accompanied by a decided increase in the temperature and pulse rate. These are not characteristics in other types of ulceration. In tubercular ulceration there is a history of constant and progressive symptoms while in amoebic there is usually a history of improvement and relapses. Tubercular ulceration involving the rectum and sigmoid seldom yield to treatment. Amoebic ulceration in this climate can be cured by one method or another.

Bacterial types of ulceration are usually very difficult to treat. Within the last two years Hanes has found cauterization with the high tension electric spark to be a most valuable means of treatment.

Tubercular abscesses often occur about the rectum when patients otherwise show no evidence of tuberculosis. The abscesses and subsequent fistulae are characteristic in that there is a great tendency to undermine the skin. The external openings are therefore large with a livid appearance of the surrounding cutaneous structures. They point to impending trouble which may be precipitated months or years hence. This being true it is of great importance that direct the habits, hygiene, etc., of individuals thus afflicted.

Fistulae of long standing with one or more very small external openings with a history of an extensive abscess are very difficult to cure. From external evidences they appear to be very simple. Usually the finger when introduced well into the rectum will be able to detect by careful palpation the hard indurated sinuses which often extend surprisingly high up by the rectum.

Internal fistulous openings rarely if ever perforate the rectal wall unless there is some pathology primarily in the rectal mucosa whereby its resistance is impaired. The internal openings of the fistulae are usually in the anal canal. The anal tissues are almost always diseased before the abscess is formed, therefore it is reasonable to suppose that the infection passes out through the diseased anal structures and is responsible for the abscess.

There are occasional fistulous tracts that extend up by the rectum to considerable heights and are very tortuous. It is difficult to follow these sinuses to their terminations when operating. When the wound heals and a small opening remains it is fairly certain that some part of the original fistula was not reached. It is then advisable to inject bismuth paste which will often effect a cure.

Furunculosis and is undoubtedly a local infection. The focus of the disease is below the pectinate line and at the anal margin. It has been the author's practice to remove the diseased tissues at the margin of the anus and from the emulsion of these diseased tracts res bacteria are cultivated and an autogenous vaccine administered to the patient. The operation with a toxigenous vaccine obtained in this manner gives decidedly the best results.

Krouse, L. J.: Spasmodic Stricture of the Rectum. *T. Am. P. and Sec. D. Trust*, 9 June.

Spasmodic stricture of the rectum is often called phantom stricture on account of its imaginary existence. Krouse states that in the early part of the last century it was more frequently diagnosed than later on. At the present time the opinion regarding the existence of such an affection is equally divided between those who are firm believers and those who doubt its existence.

After quoting the statement of various authors well versed in rectal pathology he expresses his own opinion as to its existence and reports several cases. He agrees with few writers who believe that spasmodic stricture is often the forerunner of the more serious disease of benign stricture of the rectum. He reports several cases.

Krouse claims that spasmodic stricture is not a disease but only a symptom of some other disease located in the rectum or in an adjoining organ. His conclusions are:

1. It is not a common affection.
2. It is easily detected on digital examination.
3. It often terminates in an annular fibrous stricture.
4. It involves the lower Houston valve.
5. A rectal ulcer is the most important etiological factor.
6. Curing the ulcer in its early stage lessens the chances of the development of an annular fibrous stricture.

Syphilia, regarded as a contagious disease as other exanthemata, is characterized by its chronicity and virulence. The only exception to its point of inoculation being confined to tissues covered by squamous epithelium, is within the rectum.

Its frequency in the rectum and anus is not realized and, consequently, is not recognized by the profession. Its relationship to fistulae and stricture is emphasized, and the importance of tuberculous in these two conditions minimized. The careless treatment of fistulae is proverbial. The possibility of stricture resulting from secondaries later in life is suggested.

Drueck, C. J.: How to Examine the Rectum. *Chicago M Recorder* 1916 xxxviii 280

A very careful clinical history should precede all examinations. The author includes an outline which he has found serviceable and which allows for a detailed history.

The examination comprises inspection, digital and instrumental examination.

Inspection reveals many points which might otherwise escape notice. Digital examination is the most important of all and should not be painful when properly executed. A careful method should be followed in making the digital examination so that no false interpretation may result.

Instrumental examination is made by boogies and specula. The former are dangerous to use and are not recommended. An ordinary bivalve speculum is usually satisfactory for an examination of the lower part of the rectum. A long conical speculum with an artificial light gives the best results in the examination of the upper rectum and sigmoid.

J. H. SKILZ.

Yeomans, F. C.: Malignant Transformation of Benign Growths. *T Am Proctol Soc Detroit* 9: 14

The benign tumors of the colon and rectum considered were of the polypoid type, solitary polyp, multiple polyposis, multiple adenomata, and villous tumor. All originate from the intestinal mucosa, are of the same histologic structure but differ in number, size, form, and the relative amounts of glandular and fibrous tissue present.

The author cites the theories of origin of multiple adenomata as advanced by Meyer, Liebert, and Schwab, and (Häuser and H. C. Ross's views on the formation of benign growths. Yeomans thinks these tumors inflammatory in character and notes the frequent history of colitis or dysentery in these cases. Intestinal parasites as causal in others, and the positive evidence of the rôle of irritation as furnished by therapy—colonoclavage or colostomy, and irrigation benefiting some patients and curing others. He reports a case of multiple adenomata in a man aged 30, colostomized in 1913 with marked benefit. Many tumors have disappeared, the remainder have retrogressed and the patient is working. There is no evidence of malignant change.

That benign growths become malignant is beyond question but the cause involves the same enigma as the cause of cancer itself. The author cites the work on neoplasms of Waldeyer, Adams, Cathart, and others, as well as modern research on the transplantation of tumors and the parasitic theory of their origin. He concludes: "All that can be stated positively is that cancer begins as a small local process—that it excites no reaction in the blood, whereby a diagnosis can be made that the individual cancer-cell is the parasite of cancer and whatever eventually explains the origin of cancer will also explain the transformation of a benign into a malignant growth."

Yeomans reports the transformation of a simple adenoma into an adenocarcinoma in a man aged 76 who had rectal bleeding of 8 years' duration, progressive constipation, and a tumor that in recent years could not be reduced within the rectum. The tumor 3.5 by 2 inches was attached just within the anal verge. It was removed under local anesthesia and both clinically and histologically was proved to be adenocarcinoma.

Villous tumor or adenoma tends to recur in malignant form so should be extirpated early, thoroughly and radically.

Multiple adenomata constitute the most important and serious type of benign growth of the intestine. Their usual site is the lower colon and rectum. Clinically they are malignant from diarrhea, hemorrhage, etc. and if neglected over 40 per cent become actually malignant. Improper local treatment as snaring, curettage and cauterization is followed by malignant recurrence in a large proportion of cases.

The curative operative procedure indicated is enterotomy either in the colon above the growths or in the terminal ileum when the entire colon is affected. If the tumors disappear the enterotomy may be closed. If they persist after prolonged irrigation and the patient's general condition warrants it, partial or total colectomy is indicated with implantation of the ileum low down into the sigmoid, the operation being performed either in one or preferably two stages.

Gaut, S. G.: Anorectal Injuries. *T Am Proctol Soc Detroit* 1916 June

While the rectum is protected by the buttocks and bony structures, it is frequently injured by external trauma, expulsion of hardened feces, and by foreign bodies swallowed or introduced through the anus. Such wounds being contused, lacerated, incised or perforated.

Laceration of one or all of the rectal coats results from careless examinations, introduction of imperfect syringe nozzles, bougies, proctoscopes, or other instruments.

Perforating wounds are caused by bollets, knife thrusts and pointed objects that have been swallowed or introduced into the rectum except when due to specific ulcers or cancer.

Recently many pneumatic rectal ruptures, the result of compressed air introduced through the anus to a spirit of fun, have been reported.

The infection of carbolic acid into hemorrhoids is responsible for extensive anorectal injuries.

The chief manifestations of superficial anorectal injuries are bleeding, sphincter spasm, frequent micturition and painful defecation, symptoms that are exaggerated when the wounds are extensive.

Infected wounds are characterized by a chill, temperature, throbbing pain, swelling and a thick yellow discharge.

In extensive injuries of the upper rectum, hemorrhage is profuse. The shock the patient ex-

lapses and soon exhibits symptoms of peritonitis, when the peritoneum is involved.

The diagnosis of anorectal injuries is easy when the nature of the accident is known, the degree of hæmorrhage, bruising and swelling noted and the buttocks, anus, and rectum inspected and digitally and proctoscopically examined.

As to the treatment minor injuries take care of themselves, while extensive injuries may require simple or complicated treatment.

Incised wounds are sutured under aseptic conditions.

Contused, lacerated and pneumatic injuries are drained at one or more points, followed by irrigation, and the ragged edges and necrotic tissue removed. Subsequently they are treated by drainage and topical applications, as fistula wounds.

Injuries of the bladder and urethra are immediately closed when feasible but if not the bladder is drained, and the wounds here and in the rectum are permitted to heal by granulation.

Small rectovesical rents are sutured, but where the rectum or sigmoid is extensively injured, the bowel is resected, or an artificial anus is established.

Rectovaginal tears are repaired by suturing the vaginal before the rectal side of the wound is closed.

Barnea, R. H. Observation on Fissure in Ano. *T. Am. Pract. Soc. Detroit*, 9 June.

The author considers fissure as an ulcer and believes that traumatic causes are of true etiological factors in the production of this trouble but that it is necessary that the tissues become inflamed and hence frail and easily torn in order that fissure be formed. He believes that catarrhal inflammatory conditions are frequently the result of an excessive carbohydrate diet and sometimes an excessive fat diet.

In the treatment of fissure he recommends palliative treatment by correcting the diet with reference to the excesses of carbohydrates and fats and placing the patient on a proctoid diet for a time. When operation is necessary, he believes that the object should be drainage rather than paralyzing the muscular fibers. He also advocates the use of a small enema before defecation in order to avoid irritation from the stool. It is very important to keep the wound clean by hot salt baths and the hot enema, in order that any foreign substance may not lodge in the wound.

Hill, T. C. Prolapsus Ani in Adults. *T. Am. Pract. Soc. Detroit*, 9 June.

The theory is advanced that all cases of procidentia recti are the result of neglect and improper treatment of what was in the beginning a simple form of mucous membrane prolapse. Correction of the condition early may prevent serious infirmity later in life.

He describes at length an operation modified after that of Goodall of London. In this opera-

tion he employs a multiple suture. He advises removing the excess of tissue distal to the ligature.

The operation is performed under local anesthesia and is advised for patients of all ages. It is particularly suitable for use in prolapse of the aged.

The author claims that the operation is painless, short and easily performed. There is absence of hæmorrhage and the end-results are satisfactory.

Terrell, E. H. The Treatment of Hæmorrhoids by New Method. *T. Am. Pract. Soc. Detroit*, 9 June.

The author presents a simple, safe and efficient method of curing selected cases of hæmorrhoids by the injection of quinine and urea solution. During the past two years 7 patients have been treated by this method with only one recognized failure. Injection of quinine and urea in solutions of from 5 to 20 per cent strength produces starvation and atrophy of the hæmorrhoids. The series reported includes only uncomplicated internal hæmorrhoids. The results of the treatment of these patients justify the author's conclusion that the method is simple, safe, and effective in properly selected cases.

LIVER, PANCREAS, AND SPLEEN

Einhorn, M. The Duodenal Tube as a Factor in the Diagnosis and Treatment of Gall Bladder Disease. *J. Am. Med. Ass.* 9 June, 1908.

The duodenal tube has made possible the obtaining of secretions direct from the papilla of Vater and the instilling of fluids in its vicinity. Einhorn has diagnosed probable cholecystitis by direct examination of the bile in forty cases. He concludes that in the majority of cases in which turbid bile is found in the duodenum in the fasting condition, cholecystitis with gall-stones exists. Turbid bile is occasionally found without gall-bladder disease, when the liver is seriously involved (neoplasms, or echinococcus, cirrhosis) or in stricture of the duodenum below the papilla. Exceptionally clear bile is associated with biliary calculi, either the gall bladder not being inflamed, regardless of the presence of stones, or the gall-bladder is entirely filled with calculi no bile entering the organ.

The macroscopic appearance of the bile is important: a clear yellow bile denoting a normal function of the liver and gall bladder while a turbid, greenish, or dark brown bile usually means a diseased state of one or both of these organs.

In a number of cases of cholecystitis an attempt was made to instill either a weak solution of argyrol or of ichthyol just above the ampulla. This treatment is based on the idea that astringents will exert a beneficial effect on the bile ducts. Infections of 20 to 30 ccm. of a 0.25 per cent solution of argyrol may be given every other day. The improvement is often striking, benefiting not only the digestive disorders but the gall-bladder condition. The author believes that duodenal alimentation finds an appro-

prate place in some forms of cholecystitis, particularly when complicated with ulcers of the stomach or duodenum.

E. K. ARMSTRONG

Denver J B: Recurrence of Symptoms After Operation for Gall-Stone Disease. *Illness* M J 19 6 xxix 419

During the period from January 1, 1910 to Jan. 1, 1916 1,031 operations upon the gall bladder or biliary passages were performed at the German Hospital with a total mortality of 7.18 per cent.

The type of operation and the mortality of each is shown by the following table

	Operations	Deaths
Cholecystectomy	360	26
Cholecystectomy and choledochostomy	14	4
Cholecystostomy	437	
Cholecystostomy and choledochostomy	23	4
Cholecystostomy, choledochostomy and pancreatostomy		
Cholecystostomy and choledochostomy	35	4
Cholecystostomy	63	12
Cholecystostomy and choledochostomy		
Cholecystostomy	23	7

Mortality 7.18 per cent

During the same period and included in the above were 42 cases that had been operated upon previously for the same disease. Of these 5 had had two previous operations and one had been operated upon 3 times without relief. In all 50 operations were performed upon these 42 cases. The operative mortality in this group was exactly 8 per cent. The 4 fatalities were due in one case to uncontrollable hemorrhage. In another to the same cause plus leakage from a cholecystododenostomy. In the third from toxemia and exhaustion, and in the fourth which was the case mentioned as having had 4 operations death was due to acute pancreatitis and carcinoma of the head of the pancreas.

It would appear that gall-stones are the most common cause of the recurrence or persistence of symptoms after operation. They make their presence known within a year and often within a few days or weeks. They are usually stones that have been overlooked or out of reach but if the gall bladder has been left the possibility of reformation of stones cannot be disregarded.

In 8 cases the cause of later trouble was either failure to dislodge infection or a re-infection of the biliary passages and pancreas. Chronic and acute cholecystitis without stones was found in 3 instances and chronic pancreatitis in 5.

The author feels that the percentage of failures from these sources would have been much higher had he not laid great stress upon free and long continued drainage of either the gall bladder or common duct or both in all operations upon the biliary passages. The use of maximum sized tubes which are allowed to remain until they practically fall out has been his rule. Operative biliary fistula always close if there is no obstruction to the normal passages and the physiological rest afforded by free drainage is of the utmost value in allowing the tissues to clear away the lurking infection.

Structure of the common duct was met with in 6 instances. In 2 they could fairly be attributed to surgical treatment since in one the duct was accidentally injured during cholecystectomy and in another a severe local infection caused sloughing of a portion of the duct itself. In the other 4 cases the condition was secondary to extensive and long continued disease of the duct such as suppurative and ulcerative cholangitis and might have been obviated by earlier operation.

In 4 cases the only lesion that could be found to account for the symptoms was the presence of adhesions. It must be said however that adhesions often extensive and dense were present in all of the cases. They are part and parcel of the healing process. It is a difficult matter to say just what part adhesions play in the production of symptoms. Where they produce definite kinks or obstructions of the stomach, duodenum or intestines it is not so difficult to correlate the mechanical conditions with clinical effects. The author does not disturb adhesions when operating unless they are in the way. As a rule they cause no trouble and if disturbed, they are sure to reform and probably more densely than before.

More recurrences took place after simple drainage of the gall bladder than when it was removed. Thus in half of the stone cases recurrence was due to calculi left or re-formed in the gall bladder. In one case stones were impacted in the cystic duct and would have been removed by cholecystectomy. When stones are overlooked in the common or hepatic duct it is, of course, clear that the treatment of the gall bladder is of no moment so far as subsequent obstructive symptoms are concerned. It is better to remove the diseased gall bladder when complicated by pancreatitis.

The causes of recurrent symptoms following operation for gall stone disease are the following:

Late operation and extensive pathology

Type of operation not adapted to the lesion

Overlooking stones in the gall bladder or ducts.

Reformation of stones

Persistence or recurrence of infection of gall bladder, ducts or pancreas

Insufficient drainage.

Adhesions, especially adherent duodenum pylorus or stomach

Internal biliary fistula.

External biliary fistula.

Contraction of papilla of Vater

Stricture of the common duct

Stricture of the hepatic duct

Stricture of the cystic duct

Chronic pancreatitis, pancreatic lymphangitis and interstitial pancreatitis.

The type of operation done must necessarily influence the result, for example draining the gall bladder when it should be removed or vice versa, draining the gall bladder externally when it should be drained into the duodenum, failure to drain when there is present a cholangitis, pancreatic lymphangitis.

4 Recent surgical experiences in young children afford clinical basis for such hopes.

5 In view of the otherwise hopeless nature of the case the biliary tract should be explored as soon as the diagnosis is sufficiently established and if the anatomical relations permit—16 per cent of published cases—an artificial passage to the bile to the duodenum should be made. When for any reason, this cannot be done at the time of exploration, an external outlet for the bile should be provided. A repair operation may be attempted at a later date. Meanwhile the child's nutrition should be maintained by the administration if necessary of bile or bile salts.

EDWARD L. CORNWELL.

MISCELLANEOUS

Davis, J. D. S. Value of Pain, Jaundice and Tumor Mass in the Differential Diagnosis of Diseases of the Right Upper Quadrant of Abdomen. *T. 4: 4 Oct & Gyac Indianapolis 9 6 Sept.*

The usual symptoms of peptic ulcer are pain, vomiting and hemorrhage the most important of which is pain.

Pain is the earliest definite symptom. It is usually aggravated by large amounts of food and often relieved by small amounts. Pain may come on during ingestion of food but more frequently comes on a few hours after meals and at night. Gastric ulcers are often characterized by periods of long remission intermittency occurring for long periods of time during which the patient often believes himself well.

The X-ray examination will often be a helpful aid in determining the presence of peptic ulcer. Much valuable information may be secured by the roentgenologists, many of whom claim to diagnose 75 per cent of ulcers.

Peptic ulcer diagnosis is usually based upon the presence of localized pain, followed by vomiting, frequent presence of occult blood in gastric contents or stools, hypersecretion, increased amount of gastric contents, reliable findings with the X-ray and often history of an old irritant dyspepsia.

If hemorrhagic pancreatitis is sudden and violent in onset is characterized by excruciating deep-seated pain usually in the epigastrium or between the xiphoid and umbilicus associated with severe nausea and vomiting, hiccough, constipation, and albuminuria frequently results.

Acute suppurative pancreatitis usually begins suddenly with severe epigastric pain, vomiting, hiccough, chills, and an irregular pyrexial temperature and progressive tympanitis.

In pancreatic calculi paroxysms of pain may be due to the impaction of stone. The pain advances along the lower left costal border to the back rather than to the right side. Detection of free fat in stools or glycosuria may markedly aid in the

diagnosis. Characteristic calculi found in the stool is confirmatory. Jaundice rarely appears in pancreatic lithiasis unless the stone passes into the common duct and becomes lodged. If this takes place or if pressure is made upon the common duct by inflammatory swelling jaundice may occur.

In cholecystitis pain may or may not be very severe, depending largely upon the amount of obstruction produced by the swelling of the ducts.

Epigastric pain with local soreness beneath the right rib margin is usually followed by nausea and vomiting. When the common bile-duct is occluded jaundice with chills and high temperature may result.

Renal calculus is accompanied with severe pain when the stone gets into the kidney pelvis or ureter in its position and blocks the flow of urine. The pain radiates from the loin obliquely downward into the right iliac region—the front of the thigh, bladder or genital organs. Symptoms from renal stone depend upon the size, character and location of the stone. The pain may appear suddenly and is of an agonizing character associated with marked muscular rigidity or spasm. If the stone passes, pain may suddenly cease leaving the bladder more or less irritated. If the stone is rough it may produce much uricæmia and hemorrhage. If the ureter remains long blocked by a stone hydronephrosis marked by tumor mass beneath the costal region may be found. When suppuration occurs in connection with stone pyelonephrosis results and pus, blood, cast and albumin may be found in the urine, and severe symptoms may result.

The liver when enlarged from hepatic abscess may extend several inches below the rib border. When distended by other infections, dull aching pains are present all over the abdomen. The pain is most acute during the night or early morning. Indigestion, headache, lividitate coated tongue and a foul breath may be present. Loss of appetite, weight, and sleep may take place and at times yellow skin, chills, and rigors at times occur with pain and tenderness over the liver. If the abscess swelling is sufficient to press on the bile radicles the jaundice is slight but if the pressure is sufficient to obstruct the common or hepatic duct there will be marked jaundice.

Flloating kidney pain is not so severe as that from renal stone and is localized in the right side of the abdomen. If the ureter is elevated or pressed upon by the descent of the kidney, pain will result. If a band of fascia or blood vessel is abnormally located so as to drag across the ureter in the kidney descent in a manner to obstruct the ureter the patient may suffer pain in the loin which may be projected down along the ureter. When the attachments are loose enough to admit free mobility of the kidney the ureter is not liable to kink and the kidney remains symptomless.

Nephromata or hypernephromata cannot often be distinguished from floating kidney. It is usually

tender to pressure but unaccompanied by pain. Nephromata may or may not be associated with sex abnormalities.

In appendicitis the pain in a large number of cases occurs at the epigastrium and then is diffused over the abdomen and generally localizes at or near McBurney's point. If the appendix is long enough to extend into the region of the gall bladder and ducts its inflammation may excite symptoms of cholecystitis or choledochitis and the pain may be at the rib border. If located behind the cæcum pain may be referred to the loin or to the right rib margin. If in contact with the ureter the pain may simulate that of renal stone. Regardless of its location it is often the cause of gastro-intestinal disturbances—pylorospasm, hyperchlorhydria, and general intestinal irritation. Appendicitis is usually accompanied by temperature, high or low. In fact in acute attacks elevation of temperature is the rule. Its existence is often doubted when other symptoms are unaccompanied by temperature. Nausea and vomiting are usually present in all of these conditions but are not significant or especially characteristic.

Jaundice is a valuable diagnostic sign. It appears in appendicitis and renal disease only as a result of sepsis.

Obstructive œdema due to a duodenal ulcer near the ampulla of Vater sometimes results in a closure of the common bile-duct and may cause pancreatitis and jaundice.

Choledochitis and cholelithiasis are accompanied by slight or marked jaundice which may be of an intermittent or transient type. It may be so slight that an examination of the conjunctiva or a chemical examination of the urine is necessary to detect it.

Pressure by pyloric cancer upon the common duct may give rise to jaundice of a constant progressive intense type.

Peptic ulcers both of the stomach and duodenum are at times so infiltrated as to cause a tumor mass that may be felt in the median line or beneath the right rectus muscle which is at times very tender to touch. Pyloric cancer produces a tumor that at times is freely movable upon full inspiration and is separated from the costal margin by a distinct depression. They are usually far advanced when palpable—firm irregular often painless and not very tender to pressure.

When the gall bladder is disturbed from obstruction to the cystic or common duct it produces a pear shaped tumor mass at the margin of the liver movable synchronously with the diaphragm and presenting no depression between the rib margin and the tumor mass.

Appendiceal tumors may be located anywhere in the abdomen. They are sometimes six or more inches long and may become attached to any other abdominal organ. When inflamed they may become fixed by adhesions to some surrounding tissue.

Floating kidney tumors are usually marked by smooth, sharp outlines and mobility. They are usually free from pain and tenderness unless obstruction results from ureteral pressure.

A hydronephrotic or pyonephrotic kidney is usually stationary or fixed well back into the loin and does not move with the diaphragm. The hydronephrotic kidney usually presents no urinary findings while the pyonephrotic kidney is usually accompanied by septic symptoms the urine showing blood, pus, albumin, and casts.

Pain is the most prominent symptom in all conditions of the right upper quadrant and is of great value in a differential diagnosis if the peculiarities and characteristics of pain common to each condition is kept in mind.

Regardless of every aid in diagnosis it is often difficult to differentiate and instead of waiting months or years for the trouble to clear up an exploratory diagnosis under nitrous oxide gas-oxygen or novocaine should be made.

Peak, J. H. Visceroptosis. *I ter at J Surg* 916
xix 193

The author's principal aim in this paper is to show the development of operative procedures for the relief of visceroptosis. In so far as the morbid entity and what might be termed the medicinal treatment may be concerned every physician ought to be perfectly familiar with these features therefore, the author deals briefly with the surgical phase of the subject in concluding his paper.

The extent and character of the existing ptosis will necessarily determine the surgery to be undertaken. The rule the author follows if the patient is a relatively good surgical risk, is to first perform nephropexy then place the patient on the back and open the abdomen in the median line above the umbilicus abrade the upper surface of the liver with a gauze sponge shorten the round ligament of the liver plicate the gastrosplenic ligament and anchor the colon by attaching the greater omentum where it comes off the colon to the abdominal wall at about the normal level of the colonic position. (This last procedure the author has performed many times during the last ten or fifteen years.)

Following the operation the patient is placed in bed with the foot elevated ten or twelve inches. This position is necessary in order that adhesions may form properly about the kidney and liver. An exceedingly light diet is maintained and the bowels kept open by enemas rather than purgatives. The patient should be maintained in this position for twenty-one days but can be shifted slightly from side to side to change the center of gravity and thereby give the parts rest. At the end of the third week the foot of the bed may be lowered to the normal level and the patient will be able to leave the hospital at the end of the fourth week.

EDWARD L. CORNWELL.

SURGERY OF THE EXTREMITIES

DISEASES OF THE BONES, JOINTS, MUSCLES
TENDONS. CONDITIONS COMMONLY
FOUND IN THE EXTREMITIES

Cunningham, S. P. Regeneration of Long Bones
Following Infection. *Trans St. J. Med.* 9 6
xli 5

The author considers the methods of treatment which have been of most value in treating infected long bones resulting from compound amputated fractures. The principles to be kept in mind are (1) the general condition of the patient (2) the injured member should be placed in as nearly a normal position as can be maintained without interference with the blood supply by band bags and extension (3) when infection is severe but not too extensive should be made to the part to promote drainage and a splint applied under the limb to facilitate the changing of dressings. Probing manipulation, and irrigation should be avoided. After infection is controlled the author uses the Moorhead wax to dry fill the cavity. He has reached the conclusion that bone regeneration is the result of the combined action of the periosteum and blood-clot. Two cases are reported. J. W. W. SCOT.

Cameron, H. G. Osteogenesis Imperfecta. *Proc. Roy. Soc. Med.* 19 6 ix, Sect. D. Child 43

A case is reported of this rather rare bone condition in a child aged five years.

The author makes these three observations (1) Osteogenesis Imperfecta is a condition characterized not only by deficient ossification and fragility of the long bones, but also by a typical and peculiar formation of the skull which consists of bulging the temporal region sufficient to displace the upper part of the ear (2) The shortening of the limbs is more marked in the proximal than in the distal portions of the limbs. Characteristic expansion and the tortuous, sinuous outline of the shaft of the long bones are noted. J. W. W. SCOT.

Remy, C. E. Bl. Sclerotics Their Relation to Multiple Fractures in Childhood. *Am. J. C. M.* xlii 9 6 xli, 33

The author traces the heredity of blue sclerotics or osteopathylous, and finds that with an exception the condition of fragile bones was transmitted by the females and occurred only in the males. He also finds that in addition to the fragility of the bones and the blue sclerotics, in all cases presenting blue sclerotics, there is an accompanying flat foot and a peculiar tendency of the lower eyelid to cover the lower portion of the iris. He thinks the condition is due to a congenital deficiency of the matter furnishing the bones their elasticity.

J. R. M. A. T. M.

Wilcox, H. W. Osteo-arthritis. *Colo. Med.* 1916
xlii 53

The author uses the classification of G. L. H. Walte and gives a review of the present-day beliefs concerning the etiology and treatment of osteo-arthritis. Some of his conclusions are as follows:

Any inflamed joint should be put as far as possible in a condition of absolute rest. This relieves pain and tends to arrest changes going on in the joint tissues thus preventing deformity and possibly ankylosis.

If the focus of infection is known and is accessible to removal it should be gotten rid of.

If there are deformities which can be corrected, either in the diseased joint or in another joint closely related to it, any such defect should be corrected and the joint held in normal position by whatever means necessary.

A terminal emolument seems not to influence the reparative process greatly. R. B. CORLISS.

M. Mahall, H. W. A Case of Multiple Cartilaginous Exostoses. *Am. J. Orth. S.* 19 6 xi 336.

The author reports a typical case of multiple osteochondromatosis. X-ray plates demonstrate abnormal growths in the cervical, dorsal, and lumbosacral regions of the spine, on the right scapula and both ulna bones, femora, tibiae, fibulae, left humerus, right humerus, ulna, and first metacarpal bone of the right hand. A small tumor on the fifth cervical vertebra was followed by relief from slight distress previously complained of locally in the neck and head. Microscopic sections of the excised mass indicate its benign character and show an irregular grouping of hyaline cartilage and bone trabeculae surrounding the bone marrow.

The history in the author's case tends to confirm the opinion as to the importance of congenital developmental defect as causes and their transmission from mother to offspring, also the location and size of abnormal growths indicate that continuous mechanical trauma or repeated mechanical irritations may accelerate the growth. PHILIP LEWIS.

Griegel, D. M. A Case of Symmetrical Pressure Fibromatosis. *Edinb. Med. J.* 9 6 xi 444

The clinical findings in this case were hard movable growths, with fascial attachment, just posterior to each great trochanter of the femur and over each ischial tuberosity. The tumors of the trochanters were removed and on examination were found to be composed of a dense fibrous material in the center of which were found tubercles with the accompanying lymphoid and giant cells but no demonstrable tubercle bacilli. The author was inclined to believe that the growths were either desmoidal or basal in origin and were result of irritation. J. R. M. A. T. M.

Moore J. E.: Osteomyelitis Involving the Hip-Joint. *Ann Surg* Phila. 1916 14:11 473

Eighteen years ago the author denounced the use of the term epiphyseitis as applied by most writers to an acute inflammation of the hip-joint. He believed then that the condition was one of acute osteomyelitis and subsequent observation has confirmed his opinion that the condition does not arise in the epiphysis, but on the shaft side of the bone. The term epiphyseitis was suggested by Macnamara because of the rarity of osteomyelitis in this location and the absence of a diagnosis until the epiphysis had become separated. The name osteomyelitis as applied by the author is not strictly correct as the neck of the femur has no medulla but the process resembles osteomyelitis in every other particular and demands the same prompt treatment. When the diagnosis is made very early before the joint is involved an incision should be made over the greater trochanter and an opening drilled through the trochanter and the center of the neck of the femur in its long axis until the seat of the infection is reached. When the diagnosis is not made until the joint is involved it is better to open directly into the joint from the front. When a late operation is done, a formal excision should not be made unless the neck is completely necrotic, but as much as possible of the neck should be preserved for future use.

Four cases are cited as proof of the correctness of the author's contentions. All of them occurred in children under twelve and all involved the neck some with and others without joint involvement. He suggests that it might be well to revive the old term "acute osteitis of growing bone." GARRWOOD

FRACTURES AND DISLOCATIONS

Campbell W. F.: Colles Fracture. *Med Times* 1916 33: 161

The author gives a detailed discussion of Colles fracture. He contends that the reasons for imperfect reduction of these fractures are largely a lack of appreciation of the fact that the fractured fragment are locked impacted and must be disengaged before they can be normally replaced. In order to accomplish this anesthesia for securing complete relaxation is essential. Colles fracture is not an "off fracture" it is a hospital fracture and if the fragments are accurately reduced retention is easily accomplished with almost any kind of splint. R. B. CORFID

Serafini C.: Isolated Fractures of Head of the Radius (Sulla frattura isolata del capitulo del r.). *C. R.* 1916 24: 1

Pure isolated fractures of the radius are comparatively rare. The author gives a short historical review of the subject from Veracelli's memoir in 1851 down to the present time. He divides the traumatic lesions of the head of the radius into the three following classes:

1. Fractures which involve the head alone either complete or incomplete

2. Fractures which involve both the head and neck of the radius in which the direction of the line of fracture injures the mass of the head for a much greater extent than the neck complete and incomplete. These are fractures of the head radiating to the neck

3. Fractures associated with the head and neck, so-called explosive fractures. In which the fractured diaphysis at the level of the neck supplemented by the continuation of the traumatizing action in directly in the head of the radius which is broken into several fragments. In this variety fracture of the neck is primary and of the head secondary

The author gives short histories of 57 cases gathered from the literature and adds fuller details of 7 personal cases which he has observed in five years. In 22 cases the injury was caused by a fall on the palm of the hand with the forearm in flexion. In 28 cases the injury was due either to a fall on the elbow or to the elbow striking some hard object.

Generally such fractures are more frequently due to direct than to indirect trauma. The etiology, mechanism, pathologic anatomy, symptoms, diagnosis, surgical and non-surgical treatment as well as the results are discussed.

Clinically such fractures are recognized by the tumefaction and the pain localized to the external part of the elbow under the epicondyle by the limitation of movements especially of pronation and supination and by the dislocation and malposition of the fragments. Clinical examination should invariably be supplemented by radiography of the elbow in different positions.

Mobilization and massage may give good results but if there are free articular fragments and the head is badly dislocated early operative intervention is called for. The latter gives excellent results and is preferable to late intervention. It is indicated generally when callus formation is noted. The ultimate results as to functional value cannot be stated until at least a year has passed after the injury. With free fragments the ultimate prognosis may be grave. W. A. BRENNAN

Jones R.: Malunited and Ununited Fractures. *B. M. J.*, 1916 1: 809

The author states that conditions to which the terms delayed union and non union are applied may be difficult to distinguish because there is often found even after months osteogenic changes leading to consolidation in a fracture considered to be permanently united. There may be several weeks of apparent inactivity in callus formation and then consolidation occurs quite rapidly. Delayed union is the most common in the middle of the femur in the humerus at the junction of the middle and upper third and in the tibia and fibula at their lower third.

A fundamental principle in the treatment of fractures is to secure and maintain good length and good alignment and in securing these ends care

should be taken that the circulation of the limb should be in no way impaired.

If a case of delayed union is first seen in the seventh or eighth week it is necessary to do no more than make quite sure of good alignment, length and circulation.

For old cases Jones recommends the "percussion and damming" of H. O. Thomas which consists of breaking down the soft fibrous callus, turning the fractured ends toward the skin and beating them with a mallet. A pulley is then applied to the limb and extension produced. A Thomas knee-splint is adjusted and the external maintained. Two pieces of rubber tubing are tied around the limb, one three or four inches above the fracture, the other an equal distance below. At first they are kept on twenty minutes each day, later on several hours at a time. They should be tight enough to cause considerable swelling and stasis.

In aseptic compound comminuted fractures Jones strongly recommends that the pieces be saved. If the pieces are quite loose they should be taken out, laid in alcohol and carefully replaced in position or around the site of fracture.

Weak union can be diagnosed by the signs:
(1) tenderness on pressure over the site of fracture
(2) exuberant callus formation.

The causes of malunion of a fracture are:

1. Inefficient reduction of fracture
2. Errors in method of maintaining the fracture in position
3. Errors in after-treatment. PHILIP LANE

Carr W. F. The Treatment of Fractures. *Lancet Clin.* 96 civ 493

On the basis of twenty years experience in the Emergency Hospital in Washington, and having treated more than 7,000 fractures of nearly every bone and variety Carr contends that we are retrograding if the proper treatment of fracture instead of advancing. He believes that many surgeons are too prone to impute too ready to operate and too apt to use fully methods of operating.

The methods of Lane and Milne of England are condemned since the use of plaster breaks some of the most important fundamental laws governing the treatment of fractures, such as:

1. Continued pressure upon bone causes its rapid absorption.
2. Large foreign bodies embedded in bone frequently cause, without apparent infection, a rarefying osteitis.
3. Cutting off the blood supply of part of the periosteum by pressure is equivalent in effect to removal of this periosteum.

Other important laws laid down in this paper are:

- (1) It is impossible to hold two fragments of bone, tending to slide apart from muscular action, by putting compresses over it. (2) Any incision through muscle playing over a bone down to the bone, may produce scar tissue binding the muscles to the bone at that point and interfering more seriously

seriously with motion. (3) Continued irritation of muscle and tendons at the seat of fracture often produces thickening and contraction of these muscles or tendons, and such contractions may seriously impair the motion of the joint. (4) Infection at the site of fracture almost always interferes seriously with union. (5) Inflamed and infected wounds are far more liable to infection than clean cut incisions.

These laws are fixed and immutable and the ignoring of some of them has led to pernicious methods of treating fractures that have come into common use and the sanction of high authority. Short fragments may be held in place by wiring. No appliance, however, should be fastened directly to the broken ends of long bones for the purpose of keeping the fragment in alignment but only to prevent shortening. The alignment must be maintained by splints, casts or extension—never by metal plates or any appliance encircling the bone or by a wire passed through and through the broken ends.

R. B. CORLETT.

Nathan P. W. Choice of Method in the Treatment of Fractures. *Am J S & G* 96 84

Nathan deplors the percentage of poor results in fractures handled by the average practitioner and says that the average practitioner has not been taught the application of ordinary mechanical methods. The essential fault is that the splint so often does not overcome the muscular spasm which is the primary cause of overriding fragments and that when used the plaster of Paris is not properly applied nor retained until consolidation takes place.

In fractures of the shaft of the femur the fragments are the best exposed and greatest muscular relaxation is gained by a position of semiflexion of the limb. The additional advantage of continuous extension is readily acquired by a simple apparatus of gas-pipe adjusted to fit in any bed and capable of maintaining an extension frame at any angle desired.

In fractures of the surgical neck of the humerus the arm should be abducted and externally rotated. In fractures of the femoral neck, the Thomas hip splint may be modified to keep the limb in abduction.

The best method in fracture treatment is that which requires the least skill to carry out rather than the fine elaboration of surgical technique.

R. G. P. CLEARD

Elliot J. M. Treatment of Fractures by Methods of Suspension and Extension. *J Surg Phila.* 96 i ii 64

Special attention is called to the use of extension when combined with suspension in fracture treatment. It is necessary in this kind of treatment that there be some sort of iron frame firmly attached to the head and foot of the bed and five feet above the surface to give movable points of support with adjustable pulleys. With proper adjustment the best methods are easily determined for suspension of simple fractures, of doing painless dressings, of such cases as a compound fracture of the el-

bow or for complex appliances for badly complicated fractures. The addition of a spring in the line of pull as a shock absorber is a wonderful source of relief to the patient.

In fractures of the humerus the extension can be vertical, horizontal or angular and in cases just above the elbow this angle of the arm and forearm can be varied several times during the day to avoid ankylosis formation, and meanwhile the patient can sit, lie or sleep.

Suspension of the lower extremity is variously used. In fractures in good position hammocks may be used allowing the patient to rotate the limb. For tibial and fibular fractures requiring extension and for supracondylar fractures the railway splint with the self-contained extension apparatus may be used so-called because the lower fragment rides upon a carriage that tracks on the main part of the splint while countertraction is obtained by adhesive plaster over the upper fragment attached by a helical spring to the splint. Subtrochanteric cases need the Hodgen splint. Fractures of the femoral neck require the Hodgen splint with foot extension.

R. G. PACKARD

SURGERY OF THE BONES, JOINTS ETC.

Harrison, F. C. A Splint for Drop-Wrist. *Canad. Pract. & Rev.*, 916 xii, 191.

The author describes an easily constructed splint by Southerland to be used in the treatment of injuries to the musculospiral or median nerves from which drop-wrist results.

A posterior splint for the hand and arm is made of several layers of plaster of Paris bandage three or four inches wide with a thin piece of board, one and one half inches in width, running longitudinally nearly the length of the plaster. Three more layers of plaster bandage are applied above the board and then strips of flannel are placed across the splint for the purpose of fastening it to the hand and forearm. Two more layers of plaster bandage are then applied to secure the flannel strips. The whole is then moulded to the back of the hand and forearm extending from the base of the fingers almost to the elbow. It is allowed to dry and is then cut across at a point corresponding with the wrist joint and hinged the board embedded in the plaster holding the screws firmly. A spring is then attached by metal uprights to the hand and the forearm pieces. In this way the wrist is held in a position of dorsal flexion. Flexion can take place to the extent of allowing the hand and forearm to come into line.

R. B. CORLIFF

Rich, E. A. The Treatment of Abscesses in the Course of Tuberculous Disease of Joints and Bones. *Verh. d. Med.* 1916, iv 237.

The author pleads against unnecessary and dangerous incision of tuberculous abscesses pointing out the harmlessness of the collection and the possibility of back pressure having a real function.

In his opinion, the only indication for any operative procedure is such an increase of abscess pressure as to cause intolerable pain and then the only procedure that is justifiable is aspiration under the most rigorous asepsis. Aspiration is indicated to relieve pressure and not to evacuate the cavity and in old chronic cases where the disease itself has subsided. Aspiration should be done with a No. 13 or 14 wire needle and not with a trocar. The author has had small success with the use of Beck's paste.

H. W. METERING

Ridlon, J. As to the Necessity for Operation in Joint Tuberculosis. *Chicago M. Recorder* 916 xxxviii 256.

The author reports two cases of tuberculosis of the knee joint treated by conservative methods. The first was an adult female whose right knee-joint following a fall upon it, became tuberculous and was excised with a resulting ankylosis.

Subsequently the left knee became inflamed and was examined by six eminent surgeons all of whom diagnosed it as tuberculous. Conservative treatment by immobilization, for three years resulted in a cure with a normal range of motion.

The second case was in a girl five and one-half years old. The left knee was seen after being inflamed for a year and was treated by the application of a brace. During the course of the treatment five sinuses opened up and discharged for many months. In three years the knee was cured in a straight position and in four years the knee could be completely flexed and the patient walked and ran without limping.

Excision should never be done in children. In adults it is a time-saving measure but one half such cases require amputation later on. H. W. WILCOX.

Belot and Filhouland: Osseous Repair and Proliferation (Sur la réparation et la prolifération osseuses). *J. de radiol. et d'électrol.* 1916, ii, 87.

Radiologic study of osseous traumatism of war shows that apart from those which cover spontaneously there are many with a different evolution. There may be an exaggerated osteoperiosteal proliferation. The neoformation may take the form of a voluminous callus surrounding or immobilizing a joint or involving the muscles, and the functional importance engendered may be such as to require surgical removal of the excrescence.

The callus formations observed in peace are quite different from those observed in war. The latter are large extensive rich in elements rapid in ossification often proliferating at quite a distance from the point of fracture. This is accounted for by the fact that the subjects are young and in full cellular activity. There is an abundant production of fragments more or less grouped and disseminated and almost always accompanied by debris of periosteum and thus latter constitutes the reparatory nucleus. These periosteal fragments scattered here and there even in the neighboring muscles continue

to live and proliferate, and multiplying their elements not only forms a voluminous callus but even an exaggerated one with distant osseous trabeculae.

Traumatized bone ordinarily shows a marvelous tendency to reparation: the tendency of separated bone and periosteal fragments to live exists even when radiographically they appear deprived of all relation with the body of the bone. The author thinks that a certain amount of reserve should be exercised in the removal of all bone fragments shown by the radiograph. Only those which are manifestly incapable of living should be the object of an immediate removal. These will comprise fragments without periosteum, infected fragments, fragments very distant from the injury etc. As regards other fragments the later clinical and radiographic manifestations will suggest what must be removed.

While it goes without saying that infective phenomena will necessitate an immediate wide cleansing of the wound it should be borne in mind that it is necessary to allow the bone sufficient elements to permit of reparation. Frequently absence of consolidation results from a too radical removal of bony débris.

It is more important to remove the fragments at a distance which are useless for reparation and which can act as foci giving birth to osseous formations.

The authors call particular attention to the value of radiologic examination not only in the diagnosis and study of fractures but for the determination of the physiotherapeutic treatment for the restoration of function. Clinical observation alone cannot always give sufficiently accurate information as to the nature of the obstacles opposing restoration of function, but radiography can detect them as well as the imperfection of consolidation.

W. A. BROWN.

Delagenière H. Osteoperiosteal Grafts Taken from the Tibia to Serve in the Reconstruction of Bone or in the Repair of Loss of Osseous Substance (Des greffes ostéopériostiques prises à la tibia pour servir à la réparation des pertes de substance osseuse) *Bull. et Mém. Soc. d'Chir. d'Par.* 9 6 xlii, 1918.

Delagenière gives details of 41 operations in military service in which tibial grafts have been used with good results. In his civil practice before the war the poor results which he had obtained from osseous grafts, properly so-called, forced him to renounce them in favor of osteoperiosteal grafts taken from the tibia. The tibia is easily accessible, and its internal face is large and extensive so that there is ample material for a graft. Moreover repair of the osseous wound left after removal of a graft is facile even if the graft is thick and the medullary cavity of the bone open.

He finds that autografts are best and therefore confines his practice to grafts taken from the patient's tibia and generally for the following class of cases: (1) pseudoarthroses of the arm, forearm, or tibia, (2) for the stoppage of loss of bony substance and (3) in anoplastic operations of the nose.

The result of such grafts is uniformly good. The technique of cutting the graft and applying it in the different classes of cases is described fully. The evolution of the graft is different in infected and non-infected cases. In a septic or purulating wound the phenomena are rather complex. The periosteum grafts in this condition but the osseous parts die and become necrotic. Fatulae are established which heal only when the elimination of the necrotic osseous parts is complete. At this time the graft can be radioscopically observed to be transparent, but by degrees it becomes opaque and thenceforth behaves as in the evolution of a so-called septic graft, except that in this case the evolution is much slower.

The author draws attention to the efficacy of this species of graft in cranial injuries where there is a very extensive loss of substance. Many of the cases reported are of this class. On account of its simplicity and efficacy he thinks it is indicated in all cases of important loss of cranial bone and even in minor losses when the subject shows signs of meningeal irritation.

W. A. BROWN.

Brown, W. L., and Brown, C. P. Important Points in Bone-Transplantation. *Trans. St. J. Med. Soc.* 9 6 xlii, 3.

The authors report their conclusions reached from experimental work done with bone and periosteal transplants, their result agreeing with those of the majority of investigators. They were unable to reproduce bone from periosteal transplants, either free or left attached, except from a bone where trauma was necessary to its removal, that is, only bone and bone-cells reproduce bone. Bone transplanted free into the tissues, either with or without periosteum, is always absorbed.

Bone when transplanted must be in such a position that it has a function to perform, must have sufficient contact with living bone and sufficient immobilization to secure primary union.

Clinically the graft should not be too large should be planted within the old periosteum, if possible, should be required to maintain but little mechanical support, and there should be complete immobilization for several weeks. The graft in locations in which there is continued liability to displacement, requires additional internal mechanical support.

All the periosteum at the point of contact should be preserved. The technique of the bone work should be faultless.

H. W. WINCOW.

Lyle, H. H. M. The Aperiosteal Stump and Its Care. *J. Surg. Pathol.* 9 6 xliii, 674.

In amputations there are four methods of treating the bone: osteoplastic, tendinoplastic, periosteal, and aperiosteal. The latter while the simplest and most practical is the only method most likely to give an end-bearing stump. The technique consists in removing thoroughly a small cuff of periosteum, 0.5 cm. in depth, and spooning out the mar-

row cavity for a like distance. If shreds are allowed to remain they are liable to produce painful bony spikes.

The stump should be quickly put to use. As soon as healing is accomplished massage is instituted twice daily and a 2 per cent solution of salicylic acid in olive oil is rubbed in. The stump should then be pressed against a box in the bed five to ten minutes, three times a day and this period rapidly increased. Standing exercises are soon begun and at the end of two weeks the patient should be able to wear a peg leg.

R. G. PACKARD

ORTHOPEDICS IN GENERAL

Henderson, M. S.: The Intraperitoneal Inoculation of Animals: Its Diagnostic Value in Orthopedic Surgery. *Am J Orth Surg* 1916 xiv 329.

In a series of 143 patients tested by the author guinea pigs were used in the majority of cases. As the guinea pig is rather resistant to the bovine type of tuberculosis while the rabbit is not Henderson recommends that where the patient is a child there fore more likely suffering from a bovine type of infection the rabbit or both rabbit and guinea pig should be injected.

He concludes as follows:

1. As a test the intraperitoneal inoculation is practicable and requires no special laboratory facilities. The test has been of great value in doubtful cases, and in instances in which it is possible to obtain the material for inoculation it has become a routine procedure.

2. A positive bacteriologic test in obscure lesions makes the diagnosis certain.

3. The value of negative tests increases with the number made.

4. Antiformin digestion of tissue acts on the tubercle bacilli either to kill them or to reduce their virulence so that the low resistance of the guinea pig will be sufficient to overcome them. It greatly reduces the value of the test and should not be used.

PHILIP LEWIS

Vulpus, O.: Experience with the Albee Operation for Spondylitis Tuberculosis (Erfahrungen mit der Albeeschen Operation bei Spondylitis tuberculosa). *Munchen. med. Wchnsch.* 1916 lviil 546.

Vulpus gives the results from his orthopedic clinic in Heidelberg of the Albee operation for tuberculous spondylitis. The operation so far at least as end results are concerned is little known to German orthopedists. He has re-examined 24 operated patients and reports have been received of 6 others who were operated upon. About two and one half years have elapsed between operation and the re-examination. The ages of the patients varied from 3 to 45 years the majority being under 10 years. The typical Albee technique was used.

In all cases there was easy and uneventful recovery except in 3 cases where some bony splinters had to

be removed. After the operation there was a remarkably prompt cessation of subjective phenomena. Pain ceased after a while and the patients could easily move about. Anatomic preparations made a year after operation are instructive and show that there has been a firm union around the graft and that the graft has been absorbed. All the subsequently examined patients may be considered to be clinically cured. One child died after a year of tuberculous meningitis and this was the only death. No case complicated with paralysis was operated upon and Vulpus has seen no paralysis develop after an Albee operation. In 7 cases in which there was a psoas abscess before operation this process was resorbed. As a result of his experience Vulpus strongly recommends the operation.

W. A. BREKMAN

Wallace, C.: The Operative Treatment for the Disabilities and Deformities Following Anterior Poliomyelitis. *Am J Orth Surg* 1916 xiv 400.

The author bases his article on a study of the operations at the Hospital for Ruptured and Crippled Children during the past three years.

He states that the attempt to secure ankylosis of the hip in children by doing an arthrodesis has been hopeless.

He thinks that nearly one third of the operations performed in the series would have been unnecessary if the patients had received proper brace attention.

The Scutter operations for contractures about the hip are most beneficial.

The transplantation of an active hamstring tendon when both were normal, to the attachment of the paralyzed quadriceps extensor tendon so improved the power about the knee that braces have been discarded.

Arthrodesis for paralytic deformities in children has been of little value.

The grooving of the tibialis anterior tendon into the anterior surface of the tibia and transplanting the extensor proprius hallucis tendon to the calcaneoscapoid ligament for equinovarus deformity has been helpful.

He found the typical Whitman operation the most satisfactory for calcaneus calcaneovalgus and dangle foot deformity.

PHILIP LEWIS

Davis, G. G.: Stability of The Lower Extremity in Paralysis. *Am J Orth Surg* 1916 xiv 391.

The author states that in treating paralysis the prime object is to secure support and secondarily to promote propulsion to the greatest extent possible. Stability is therefore the first consideration. Intimately associated with stability is the question of balance. Stability has largely to do with bones and ligaments but balance is largely controlled by the muscles.

If what the author calls the sub-tarsal joint is the only involved part the stability is often not marked and there are a number of ways to tal

it. In the order of efficiency he names arthrodesis, fixation of tendons, tendon-transplantation, and silk ligaments.

The ankle-joint is close to the subastragalar joint and the paralysis most frequently produces toe-drop or less often a calcaneus. Even a well-laced shoe may prevent a slight toe-drop from being troublesome. If the case is more severe the foot may be held up by fastening the extensor tendons or the peroneal and anterior tibial to the anterior part of the tibia. In the cases of calcaneus usually associated with cavus, Gill buries the tendons into the tibia posteriorly. Still the problems of the foot are comparatively easily solved without the use of apparatus.

If a little lower extremity is to be obtained one must for the assumption of the knee and hip joint of hyperextension. He can secure a little back knee by fixation of the ankle joint plus an elevated heel.

When the muscles controlling the hip and running from the trunk to the femur, especially the gluteus maximus, are paralyzed the difficulties are greatly increased. If the gluteus maximus is active then even if the quadriceps femoris is paralyzed, the gluteus will pull the femur back and frequently fix the knee, but in hip paralysis the disability is often extreme.

Where extreme external rotation is present it can be controlled by the operation of sewing the fascia lata firmly to the posterior edge of the greater trochanter while the foot is held in firm internal rotation.

PHILIP LEWIS

Willard D. P. Subastragalar Arthrodesis in Lateral Deformities of Paralytic Feet. *Am J Orth Surg* 9 6 15

The operation recommended by the author consists of an arthrodesis of not only the astragaloscaphoid, but also of the astragalocalcaneal articulations, and in severe cases of cavus perhaps the calcaneocuboid joint as well. It is more than arthrodesis; it is the welding together of the adjoining surfaces of three bones, the astragalus, scaphoid, and calcaneus. There is no careful dissection of the cartilaginous joint surfaces. Instead there is a rough digging and gouging of both the articular areas, and also the bony surface between them, with no attempt at removal of the fragments that are torn loose.

The astragalus, scaphoid, and calcaneus become one solid bony mass, movable in the anteroposterior directions but immobile for side movements. No shifting of the foot occurs. A rigid point of attachment is given to the unparalyzed muscles. No foreign substance is left in the tissues.

Two incisions are recommended: one on the inner side of the foot about a fingerbreadth below and in front of the internal malleolus on the level of the sustentaculum tali, the other on the outer side immediately below the external malleolus.

The foot is fixed in plaster at right angles to the leg. The patient is allowed to walk in the cast at the

end of four weeks, and the cast is removed four weeks later. Unless the paralysis of the other portions of the leg demand it, no braces are applied.

PHILIP LEWIS

Orr H. W. A Critique of Present Methods in the Treatment of Infantile Paralysis. *Am J Orth Surg* 9 6 336

The author is opposed to the application of braces except as a final step in the treatment of these conditions and where they have been improved to the fullest extent by the usual methods. In other words, not until the best result has been obtained which follows spontaneous recovery combined with those measures by which the patient's resources have been carefully safeguarded. This involves splinting and encasement under the direction of the best orthopedist available and for a sufficient length of time bringing the patient to the point where he is ready for results obtainable by modern methods of surgery.

Orr objects to the use of braces either as splints or as aids to locomotion except for those patients whose disability is definitely established as permanent or for those whom no other methods of improvement are possible or feasible.

PHILIP LEWIS

Rogers M. H. Operative Treatment of Infantile Paralysis. *Am J Orth Surg* 9 6 219-23

The author bases his study on 30 cases, 79 of which were over years of age and 51 under 12 years. The general policy was conservative. The author believes in operative interference in any case where a light brace is not sufficient and especially where there is developing or increasing deformity in spite of the brace. The type of case that needs attention is not always the flail foot with complete paralysis, but the case that shows a paralysis of one group of muscles and a powerful antagonistic group. Rogers does not believe in silk ligament fixation can permanently oppose constant pull from a healthy muscle. Tendon-transplantation is more satisfactory.

In the cases of arthrodesis there were 50 per cent failures.

There has been noted at the Massachusetts General Hospital a gradual change of view away from arthrodesis toward astragalectomy. Each case presents a problem in itself and must be worked out individually.

PHILIP LEWIS

Taylor R. F. Operative Treatment of Infantile Paralysis. *Am J Orth Surg* 9 6 394

It is the author's belief that tendon sutured to tendon is not so efficacious as tendon sutured to peroneum or bone preferably than the insertion of the paralyzed tendon if it is to replace. A muscle to be transplanted and to functionate most successfully must have its tendon pulled in as straight a line as possible from its origin to its new insertion.

No silk extension is comparable in result to plan-

ning and effecting an operative procedure so that there is ample tendon to reach to the new insertion.

Adhesions in the transplanted tendon are to be avoided by carrying it through subcutaneous adipose tissue through the sheaths of tendons that are to be replaced or through septa in which non-closable foramina have been made by plastic flaps and by early electrical stimulation to prevent adhesions from forming. Several small skin incisions are preferable to two large ones. Subcuticular silver stitches are less likely to lead to adhesions.

The question of time when weight bearing is to be permitted depends upon the severity of the original deformity, the strength of the transplanted tendon and the security of the mechanical fixation by sutures, the possibility of early muscle training in active exercises, electricity, massage, etc. Weight bearing should not be permitted sooner than 30 days and then with some support.

Fine intestinal silk is preferable to catgut, kangaroo tendon or heavy or paraffin-coated silk in suturing the tendon accurately to the peroneum in the bone groove.

PHILIP LEWIN

Ryerson E. W.: *Methods of Stabilizing the Flail Foot in Infantile Paralysis*. *Am. J. Orth. S.* 1916 xlv 337.

The author advises more frequent resort to astraglectomy in the feet which are very weak and in addition a fixation of the tendons by the Gallie operation slightly modified.

Whitman's operation of astraglectomy and backward displacement of the foot is of great value in the treatment of calcaneus deformities. Arthrodesis has a distinct field of usefulness in patients over fourteen years of age.

Silk ligament suspensions may have to be removed or the foot may relapse and it is extremely difficult to control lateral deviations of the foot by this means.

Ryerson was unable to get good results with the autogenous bone peg or dowel driven through the lower end of the tibia and through the astragalus and os calcis. For six months he used the Gallie method of inlaying the tendon in the groove gouged in the bone and in addition to this drilled a hole through the bone at the upper end of the groove. He then dissected up the proximal portion of the tendon cut off as high as possible, passed it through the hole and brought it down in loop-fashion to be sewed side by side to the portion lying in the groove.

PHILIP LEWIN

Anderson W. L.: *New Methods Used in the Study of Flat Foot at Yale*. *Med. Times* 1916 xli 144.

Methods of diagnosing static foot troubles and their correction as carried out at Yale University are given by the examiner, the author.

There has been added to the equipment of the medical office the most modern form of apparatus for making a diagnosis of faulty foot conditions.

This apparatus consists of a wooden table 36 inches high with a top surface 20 x 26 x 2 inches in which is sunk a 13 x 13 x 25 inch plate glass section. Seven inches below and fastened by hinges to the rear legs of the table is a 13 x 22 inch German silver reflecting mirror which can be adjusted at varying angles from 30 to 45 degrees to the plate glass in the top of the table. Clutches on either side of the frame holding the mirror enable it to be fixed at any one of these angles which adds to the comfort of the examining physician. On the sides and fastened to the diagonally opposite legs are electric lights with 15 watt frosted globes set in aluminum lined reflectors so arranged that their rays are thrown directly upon the glass top. At a convenient distance in front of the table a long mirror 20 x 54 inches, which is also adjustable is placed so that the patient is able to see the bottom of his own feet as he stands upon the glass-topped table. In this way the physician as well as the patient has an exact picture of the actual degree of foot fault while the feet are maintaining the weight of the body and photographs of the foot condition can be taken if desired.

R. B. CORFIELD

Jones, R.: *The Soldier's Foot and the Treatment of Common Deformities of the Foot*. *Brit. J. J.* 1916 l 783.

In the treatment of hammer toe the author advises against amputation particularly if the affected toe is as is usually the case the second toe for this removal is likely to cause the development of hallux valgus. Arthroplasty is not advised. The operation advised is a wedge-shaped excision removing the articular cartilage on both sides of the joint so as to definitely ankylose the joint in extension. An oval piece of skin, including the usually present corn, is excised and the flexor tendon is cut and the toe put up in extension on a little splint. This splint is worn for some weeks to insure ankylosis in the extended position.

In displacement of the little toe the displacement is similar to that of hallux valgus. Amputation is the treatment advised. A good-sized flap is necessary to overcome subsequent contracture. If a callus is present over the head of the metatarsal walking with a shoe is not permitted until the callus has softened up and the skin becomes more nearly normal. Only very exceptionally should the head of the metatarsal be removed also for this forms one of the points in supporting the foot on which a soldier's marching power depends.

Metatarsalgia is a peculiarly painful disability of the foot associated with flattening of the transverse arch. Immediate relief Jones says, can nearly always be given by removing the pressure of the body weight off the heads of the metatarsal bones by a bar behind them placed transversely across the sole of the shoe bringing the weight bearing on the neck of the metatarsals. The inner side of the heel of the shoe should be raised one-third of an inch and a band of strapping placed around the

transverse arch of the foot. In cases of longer standing not responding to this treatment the head of the metatarsal, usually the fourth, should be removed. The same type of shoe should be employed as after-treatment.

Painful conditions about the heel may be due to (1) injuries or strains about the insertion of the tendo achillis, (2) spurs of bone and adventitious bursae under the os calcis, (3) osteitis and peritonitis from direct injury of the os calcis.

For Group 2 the method of pin-firing used by the farrier is advised in the more obstinate cases where rest and elevation of the heel three-fourths of

an inch does not relieve. This condition may be due to inflammation of the bursa or strain of the insertion, but in both cases the treatment outlined in the article of band of strapping placed just above the malleolus is beneficial.

In Group 3 Jones advises an incision along the inner margin of the heel and the removal of the pus and the adventitious bursae.

In Group 4 the osteitis and peritonitis may be slight and rest usually cures these, but if they are associated with a gross fracture of the os calcis or astragalus of any severity the patient will not again be fit for service. M. S. H. 1908, 40.

SURGERY OF THE SPINAL COLUMN AND CORD

Graves J. C., Jr.: Backache from the Viewpoint of the Orthopedist. *Verh. d. M. d. G. S. 1908, 166.*

The author presents some definite suggestions as to the various causes of backache. They are coming to be understood by the orthopedic surgeon.

A atomic peculiarities of form together with imperfect adjustment of the parts result in the most important factors in backache. There also definite pathological conditions which may be present separately or in conjunction with the variations of form or adjustment, such as the hyperostrophic form of arthritis which is apparently due to disturbance of the metabolism, the localization of the symptoms being due to the localization of the infectious arthritis is another reason. In many cases of disease frequently associated with backache, apparently any of the infectious organisms may at times lead to joint symptoms. K. B. Curtis.

Elmer W. G.: The Handling of Children with Tuberculosis of the Spine While They Are Under the Influence of an Anesthetic. *J. N. Surg. Phila.* 1908, 131, 34.

The author cites two cases from his own experience which show how important the self-protection offered by the muscular system is in cases of tuberculosis of the spine. In children, especially the relaxation of the patient under a general anesthetic makes it very easy by slight torsion by stretching or by increasing the kyphosis to do great permanent damage. In one of the author's cases he believes that tuberculous material was forced into the spinal canal. In the second case in attempting to push the child further down on the table the spine was buckled like a hinge.

Since it has been shown that children bear bone-grafting into the spine very well, and that the results are very satisfactory, great care should be taken to prevent such accidents as the above, as very little violence is required in this type of case. The author suggests the application of a cast on the day preceding the operation. This cast is split on both sides in the midaxillary line and the following day

the child may be placed upon the table and the anterior half removed. After it is thoroughly anesthetized it may be turned to the prone position, without danger of injury to the spine and the posterior part of the cast removed. At the end of the operation the cast may be reapplied very quickly and fastened with strips of adhesive plaster. (L. W. H. 1908, 131, 34.)

Hatch F. G.: The Treatment of Scoliosis. *South M. J.* 1908, 67.

The thoracic scoliosis is the most difficult to treat. Those cases due to empysem, rib-ribs, or marked structural scoliosis without bone pathological lesions give poor prognosis.

The author believes Abbott's treatment has now taken the recognized method of scoliosis and that it is one of the greatest advances in mechanical surgery ever presented.

The conclusions reached are as follows:

The Abbott method of treatment gives far better results than any other method used either in the past or the present.

1. The technique is a complicated one and there are very few men who put on the jacket as Abbott teaches even though they use his frame.

2. It takes from three to six corrective jackets to effect a cure. Each jacket holds the spine about seven weeks or as long as one can further correct the position by the application of the felt pads.

3. While we strive to overcorrect our cases it is not always possible to do so, but in practically every case the children can be placed in a nearly normal position.

4. After the patients are corrected, exercises are used daily for many months. These must at first be given by a competent instructor and later carried on at home. If the patients do not carry out the exercise treatment they will gradually relapse.

5. In a warm climate it is often wise to put on a thin extension jacket for the summer and start the correction from that point again in the fall.

H. W. Stevenson.

MISCELLANEOUS

CLINICAL ENTITIES—TUMORS, ULCERS
ABSCESES, ETC

Hazen H H: Cases Illustrating the Faulty Treatment of Superficial Malignancy *J Am M A* 1916 Lvi 1829

During the past three years the author has been consulted by 32 private patients for malignant conditions of either the skin or mucous membrane of the mouth. Of this number only 6 consulted him for early untreated stages of cancer. One of these had a cancer on the under surface of the tongue while the remainder had cancer of the face.

The faults in handling the other cases naturally group themselves under three headings: (1) neglect on the part of the patient; (2) faulty diagnosis on the part of the physician; and (3) improper or insufficient treatment by either physicians or quacks. In 9 instances patients had neglected themselves without seeking medical advice. In this series there were 6 cases that had been wrongly diagnosed by the attending physicians and 12 cases were either improperly or insufficiently treated after a correct diagnosis was made. In several instances more than one faulty method of treatment was employed. 4 cases had been treated by caustics; 5 patients had operations performed from which rapid recurrences took place. One small basal-cell lesion of the cheek had been treated by fulguration with a recurrence in nine months, the recurrence being both deep and wide. 1 of the patients had been treated by small livid doses of roentgen rays. (The new method of single dose therapy had been in use such a short time that we have not as yet had a chance to study recurrences after it, although some will doubtless occur.)

Special interest attaches to a series of 4 cases which were treated by the much vaunted radium. All of the patients being made much worse. The conclusion is:

1. The public is not yet sufficiently educated as to the importance of attending to superficial forces that will not heal.

While it must be admitted that some cases of superficial malignancy are difficult to diagnose still entirely too many of them are mistaken for other affections even by experienced physician. All suspicious growths should be positively diagnosed at once.

2. Many cases are not treated radically enough. It should always be remembered that in sufficient treatment of whatever kind is the worst possible thing for a patient suffering from a malignant condition.

3. Radium even in large dose and when administered in its greatest advocates' hands is of no value in the superficial cases that it is believed to cure.

McCouch G P., and Ludlum S D W: Is Myopathy Related to Disorders of Internal Secretions? *Med Rec* 1916 Lxxix 1042

Myotonia congenita and myasthenia are frequently associated with muscular dystrophy. Amyotonia congenita is said to have occurred in connection with muscular dystrophy and may be identical with one form of it. There is some evidence suggesting that thyro-parathyroid deficiency may bear an etiological relation to myotonia. Myasthenia is frequently associated with hyperthyroidism, hypo-adrenalism and probably with hyperactivity of the thymus. Hypothyroidism and pathological findings suggesting both hypo- and hyperactivity of the thymus are sometimes found in amyotonia. Myopathy is found in association with many disorders of internal secretion perhaps most frequently with hypopituitarism. The case reported by the authors combines the adiposity, the deficient development of both primary and secondary sexual characteristics, the small hands with tapering fingers and the enlarged sella turcica of dysraphia adiposa genitalis with the distribution of atrophy and pseudohypertrophy, proportional muscular weakness, diminution and in some cases total loss of tendon reflexes and the diminished response to electrical stimuli without reactions of degeneration characteristic of the facio-scapulo-humeral type of progressive muscular dystrophy.

Alberghini tests on a series of four cases of myopathy, one case that may be either myopathy or spinal muscular atrophy, one case of neuritic muscular atrophy (peroneal type) and two cases of muscular atrophy from syphilitic root neuritis showed hyperactivity of thyroid, thymus and adrenal in the first three conditions. In the peroneal case hyperactivity of the testis was also noted. The tests on the syphilitic cases were negative. Thyroid and thymus hyperfunction are frequently observed in hypopituitarism.

Whether the glandular disorders bear an etiological relation to myopathy or are secondary to it or whether both are due to a common cause is uncertain, but the combination is too frequent to be regarded as a mere coincidence.

SERA VACCINES AND FERMENTS

For H H: Vaccine Therapy and Other Treatment in Acne Vulgaris and Furunculosis *J Am M A* 1916 Lvi 24

A study of the examination records of the entering student at Cornell University showed that 30.2 per cent of the freshmen had suffered from acne vulgaris. Of this proportion the distribution of the lesions was as follows: 10 per cent had comedones, 10 per cent had pustules, 10 per cent had cysts, 10 per cent had nodules, 10 per cent had scars.

In order to ascertain just what results could be expected from the different forms of therapeutics, and more especially to try out the efficacy of vaccine therapy an analysis of 100 u selected cases of these two forms of pyrogenic dermatoses was undertaken.

The cases were all considered chronic, in that they were all of six months duration and no case was included in which the eruption could possibly be ascribed to drugs or occupation or to syphilis. An attempt was made to study the bacterial etiology of either condition except in so far as was necessary for the preparation of the autogenous vaccines, since that has been so well worked out by previous investigators and also because ordinarily the stock vaccines are prescribed on the basis of a clinical diagnosis.

All the patients studied were instructed, before beginning treatment, to avoid such foods as seemed to disagree with them, not to eat to excess, to eat slowly and at regular intervals, to drink plenty of water especially on rising in the morning, to see that the organs of elimination were functioning normally, or if they were not to consult the physician to change before resorting to medical correctives. Locally they were to remove the comedones by gentle massage after first having relaxed the skin by applications of towels wrung out of hot water. Following the removal of the blackheads, they were to apply to the face towels wrung out of cold water in order to tone up the skin and cause a diminution in the size of the pores.

In the tables given the most striking point and one not generally brought out by writers on the subject was the fact that in the 74 cases of acne treated not one of the cases developed in a student engaged in athletics. The author does not mean to imply that acne has never occurred in athletes, but he wishes to point out that the table shows the great part athletics plays in the prevention of acne. On the other hand, however, nine cases of furunculosis, out of a total of 36 occurred among students engaged in athletics. These cases were due to direct infection and without exception occurred among the wrestler and crew men, the location of the lesion being typical of the cause of the trouble.

Dietetic errors and digestive disturbances accounted for from one-third to one-half the cases in each group. Comedones were not found so frequently as many writers would lead one to expect. A majority of the cases in each group were sporadic but of those influenced by seasonal variation the larger number of cases occurred in the summer. The cases of acne also showed longer a average duration than the cases of furunculosis, the period of duration being from three to four years of acne for furunculosis six months to one year. It is interesting to note that although of the entire freshman class the larger percentage of the cases of acne were of general distribution over twice the number of students who applied for treatment did so for the facial type of acne.

Under the heading local treatment were included all applications made directly to the eruptions. In some instances the means of treatments or lotions in others particularly the coarse putter type and especially in furunculosis local treatment included evacuating the pus by free incisions and application of a dressing. Combined treatment included those cases in which the patient received the vaccines in conjunction with the local treatment. Medical treatment included cases in which the patient was treated only by medicinal treatment usually such as a lead sulphide and oil ointment.

A study of the patient results as shown shows that not one patient with severe acne cured by more after evacuation of the acne was cured by autogenous vaccine on the other hand autogenous vaccines were resorted to in the group in improvement in 5 per cent in stock vaccines in 18 per cent of the cases. The worse type of acne comprised cases in which the treatment of the majority of the lesions exceeded six months, 2.8 per cent of these patients were permanently improved, 2.8 per cent cured. The type of those in which the majority of the lesions were 1/2 inch or less in diameter exhibited by 55 per cent of the patients improved none cured.

The conclusion would seem to demonstrate first the important part played by personal hygiene in the cure prevention and treatment of acne vulgaris and furunculosis second the superiority of well known therapeutic measures or vaccine therapy to the additions made and third the value of following the case to ascertain the number of permanent improvement experienced has shown that the value attained during the time of treatment is no criteria of the changes to be seen in the results later date.

LOW & L. C. VILL

BLOOD

Barlett W M. A Method for the Determination of the Alkali Reserve of the Blood Plasma. *J Biol Med* 9 6 1924.

It must be pointed out that bicarbonates, alkali protein compounds, and small quantities of alkali phosphates together constitute the alkali reserve of the blood plasma and that under normal conditions these substances are present in very constant quantities. A diminution in the alkali reserve known as acidosis and may be recognized by a variety of clinical symptoms and by characteristic alterations in the composition of the blood urine and alveolar air.

The alkali reserve maintains the plasma at a constant slightly alkaline reaction despite the fact that all products of metabolism are continually being poured into the blood. Chief among these products so far as total quantity concerned is carbonic acid. This, as carbon dioxide enters the plasma circulating through the tissues and is taken up partly in combination and partly as dissolved carbonic

acid. An almost infinitesimal change in reaction in the direction of acidity occurs. The slight change is sufficient to stimulate the respiratory center. The resultant pulmonary ventilation removes the excess of carbon dioxide and the plasma reaction returns to its original point. An excessive production of carbon dioxide in the tissues results in a greater change in the reaction of the plasma with a consequent increased stimulation of the respiratory center and increased pulmonary ventilation. This tends to accomplish the removal of the extra carbonic acid. No depletion of the alkali reserve occurs.

The author carried out a series of experiments on a large number of normal individuals and the method he employed consisted in dialyzing serum or whole blood against salt solution in order to remove coloring matters and proteins. The hydrogen ion concentration of the dialysate was determined by means of the indicator phenolsulphonophthalein phosphate solutions of known hydrogen ion concentration being used as standards for comparison. At the outset of this work it was realized that the actual hydrogen ion concentration was not determined the results however coincided closely with those obtained by the electrical method. In severe acidosis variations in the direction of acidity were encountered. The method seemed to indicate variations in the hydrogen ion concentration although the variations observed were probably greater than those actually occurring.

Also a series of cases exhibiting clinical or laboratory evidences of acidosis was studied. These cases included nephritis and diabetes in adults and nephritis recurrent and idiopathic acetoneuria and severe diarrhoea in children and the results are recorded in detail.

Briefly Marriott summarizes his paper as follows:

1. Acidosis implies a diminution of the alkali reserve of the blood plasma though not necessarily a change in its hydrogen ion concentration.

2. A simple and rapid method for the measurement of the alkali reserve is described. It is a modification of the indicator dialysis method for the determination of hydrogen ion concentration but is more accurate and gives more information than that method.

3. The method serves for the detection and accurate quantitative estimation of the degree of acidosis.

The results obtained in twenty five cases of acidosis are reported.

GROVER E. BELLAMY

Leopold J S and Bernhard, A.: The Non Protein Nitrogenous Constituents of the Blood and the Phenolsulphonophthalein Test in Children
Am J Dis Child 1916, xl 432

The authors report the results of the examination of the blood of 50 children free from renal disease and of 16 children suffering from renal disease.

In every instance the amount of the total non-protein nitrogen of the urea nitrogen, of the uric

acid, and of the creatinin was determined. In the children free from renal disease the average of the total non protein nitrogen was 28 mg per 100 ccm of blood the average of the urea was 12 mg per 100 ccm. the uric acid average was 1.3 mg per 100 ccm. the creatinin average was 1.5 mg per 100 ccm. and the average phenolsulphonophthalein excretion was 70 per cent.

Cases suffering from some renal affection were divided into four groups: acute nephritis, chronic nephritis, passive congestion and one case of sarcoma. The phenolsulphonophthalein excretion was diminished in each condition while the non protein nitrogen constituents were increased only in chronic nephritis being within normal limits in acute nephritis and in passive congestion. In the case of sarcoma of the kidney the non protein constituents were normal with the exception of the uric acid which was increased.

From a study of their findings the authors concluded (1) that in children the blood content of the non protein nitrogenous constituents is normally practically identical with that of the adult (2) that the variations under conditions of kidney affections correspond with those changes observed in adults under similar conditions and (3) that the determination of the non protein nitrogen in the blood of children will prove as valuable a help in diagnosis and prognosis in children as it has in adults.

J W TURNER.

Goodman C. and Bernstein E. P.: Prescille Gangrene-Thrombo-Angiitis Obliterans. V F
Am J 1916 xl, 1073

The authors who believe the etiological factor of thrombo-angiitis obliterans to be an infectious agent, report 21 cases in which serological studies were made with regard to typhus fever.

They call attention to the fact that thrombo-angiitis obliterans is more prevalent in those countries where typhus fever is epidemic and they suggest the possibility of the specific micro-organism of typhus fever being the etiological factor of thrombo-angiitis obliterans.

The agglutination reactions and complement fixation tests upon the 21 cases were made according to the methods described by Orlitzky. In 18 cases the reactions were negative in 3 cases the reactions were marked one showing almost complete agglutination in a dilution of 1:200 and two in a dilution of 1:400.

The positive reactions were given great weight because 102 controlled cases gave a negative reaction and because in many instances the serological reactions of typhus patients may become negative within so short a period as five months from the termination of the disease.

J W TURNER.

Birch F W: Twenty seven Transfusions at St Luke's Hospital. *Calif St J Med* 9:6 xl 40.

In this series the method has been direct transfusion a radial artery being connected to a super

EXPERIMENTAL SURGERY AND SURGICAL ANATOMY

Dubois, E. P.: Metabolism in Exophthalmic Goiter. *Arch. Int. Med.* 1916 xvii, 915

In contrast with the symptoms on the part of the nervous system, the heart and eye symptoms which vary greatly in this disease, an increased basal metabolism was found by Dubois with great regularity in exophthalmic goiter which in severe cases he states reaches a level found in no other condition. On the other hand, in cretinism and myxoedema he found the metabolism lower than in any other diseases. The administration of thyroid extract particularly in myxoedema, raises the heat production. All other diseases in which metabolism is increased are easily distinguishable from exophthalmic goiter and they never approach the extremes found in this condition. The basal metabolism is higher than normal in youth, in fever, in lymphatic leukemia, and in pernicious anemia, in severe cardiac disease and in some cases of severe diabetes and cancer. It is lower than normal in old age and in some wasting diseases and perhaps in some cases of obesity. Diseases of the ductless glands other than thyroid show in some cases an increase in some a decrease but these are comparatively small.

From the author's experiments and observations in a large series of cases he was able to make the following summary of his work.

The metabolism in exophthalmic goiter has been studied for the first time in a respiratory apparatus which is also a calorimeter. Thirty-seven observations were made on eleven patients with this disease and six experiments were made on a cretin. With some of the patients the nitrogen balance was also studied.

The measurement of the heat production gives the best index of the severity of the diseases and of the effect of treatment. Very severe cases show an increase of 75 per cent or more above the normal average severe cases 50 per cent or more and moderately severe and mild cases less than 50 per cent while a few mild and several atypical cases or those in which operation has been performed may be within normal limits. In severe cases the warmth of the skin and sweating can be accounted for entirely by the necessity for the increased elimination of heat. At least a part of the tachycardia is due to the increased metabolism, and perhaps it might be possible to reproduce the extreme tachycardia, the cardiac enlargement emaciation, and mental irritability if it were possible to stimulate the metabolism of normal men for twenty-four hours a day over a period of months or years.

The specific dynamic action of protein and of glucose is within normal limits and there is no consistent difference between the effects of protein in meat and an equal amount in milk and eggs. One patient was able to derive 89 per cent of his calories from carbohydrate in an experiment when he was

showing an alimentary glycosuria. There is evidently no interference with the oxydation of carbohydrates.

The methods of direct and indirect calorimetry agree very closely when the technical difficulties are considered. The method of direct calorimetry gave results which were slightly lower than the indirect the total difference being 2.9 per cent the average difference in the individual being 4.1 per cent. This and the absence of abnormal respiratory quotients show that the law of the conservation of energy holds good in exophthalmic goiter and that there is no profound disturbance of the intermediary metabolism.

The average water elimination through the skin and lungs in the severe and moderately severe cases of hyperthyroidism is 39.9 grams per hour. The increase above the normal is closely proportional to the increase in heat production 25.7 per cent of the calories are dissipated through vaporization in goiter patients whereas the mean normal is almost the same 23.9 per cent.

The level of the heat production was used as an index of the effect of medical treatment. Rest in bed for a week or more caused a drop of more than 10 per cent. The effects of treatment with Beebe's serum, thyroid residue, ergotin, and quinine hydrobromate was less marked, each being tested on one patient. Ligation of the thyroid arteries with three out of the four patients studied caused a distinct rise in metabolism the duration of which was uncertain. There is as yet no proof the author states that any conservative form of treatment causes a greater reduction of metabolism than mental and physical rest.

One small cretin 36 years old produced about half the calories eliminated by children of his size. As estimated by the surface area, his metabolism was about 20 per cent below the normal adult level. Three and a half days treatment with thyroid extract raised his heat production to normal.

GEORGE E. BEILBY

Dewey K.: Experimental Hypercholesterolemia. *Arch. Int. Med.* 1916 xvii, 737

The author has made use of a watery colloid emulsion of cholesterol for intraperitoneal injections in rabbits and guinea pigs. Instead of Merck's pure cholesterol he used a preparation obtained from gall-stones by extraction with ether in the Soxhlet apparatus. For the separation of all saponifiable substances from this ether extract, a method was employed which is based largely on Kumagawa and Suto. Five grams of the dried ether extract were dissolved in 350 to 400 ccm of petroleum ether to this 70 ccm of a 1 per cent absolute alcoholic solution of potassium hydroxide and 30 ccm of distilled water were added. The mixture was shaken and the ether solution of cholesterol separated from the alcoholic solution of soaps in the separating funnel. The petroleum ether was evaporated and the dry cholesterol treated in the same manner.

ficial vein by means of a Brewer or Pope tube. The time during which the blood was permitted to flow has varied greatly depending upon the size of the tube used, the donor's blood-pressure, his heart rate, the physical condition of the recipient and the symptoms which developed during the procedure.

The hemoglobin of the patients has been frequently recorded during the process of the transfusion and has been found to increase from 0 to 40 per cent while they were on the table. If a subsequent bleeding occurs the hemoglobin is generally from 5 to 30 per cent higher on the following day.

In none of this series has any of the surgical accidents occurred, such as embolus, local infection, hemolysis or over-transfusion with its train of symptoms, or cardiac dilatation, edema of the lungs, tender tense abdomen, enlargement of the liver and spleen, and rupture of the abdominal viscera. In 3 cases, immediately after transfusion the patient developed a severe chill and high temperature. The temperature however subsided in about twelve hours.

Where the time would permit, the examination of donors consisted in taking the history, physical examination, Wassermann reaction, hemolytic tests and blood examination, with particular reference to leucocytosis, lymphocytosis, eosinophilia, parasites, etc. It was not possible to make all of these examinations in nine of the emergency cases. Under these conditions relatives of the patients were always used as donors and no harmful results were observed from the transfusions. In one case the blood transfused was from the patient's son, and had previously been tested in the ordinary way yet this patient developed the most marked reaction in the form of a chill and fever of any of the series.

The cases transfused to minimize surgical risk were quite satisfactory. The cases transfused for diseases of the blood, although showing slight benefit, were on the whole unsatisfactory. Cases transfused for shock demonstrated the value of this procedure.

The author believes that there is no excuse for a surgeon permitting his patient to die from shock or hemorrhage without giving him the advantages of transfusion. Transfusion should be looked upon not only as a method for reviving moribund cases with hemorrhage and shock, but also as the best prophylactic in preventing these conditions in individuals who are anemic, depleted, and weakened by disease. Many after transfusion are enabled to withstand major surgery. ALBERT EISENBRAND.

BLOOD AND LYMPH VESSELS

Vinavencio. Treatment of Accessible Arterial Aneurysms (Nota sobre el tratamiento de los aneurismas arteriales accesibles). *Gac. med. d. Caracas* 9, 6, 1911, 64.

The author discusses the comparative merits of ligation and radical extirpation. He refers to six cases which he operated upon. Two cases of aneur-

ism of the carotid treated by ligation and 4 cases of aneurysms in the limbs treated by extirpation, i.e., one of the superficial femoral, one of the popliteal, one inguinal and one axillar.

The two carotid aneurysms recovered perfectly without complication. In the femoral aneurysms, gangrene developed and the patient died. The other three limb aneurysms recovered perfectly but complete and radical extirpation of the aneurism alone was extremely difficult on account of adhesions, etc.

The author believes that the radical cure of accessible arterial aneurysms ought always to be the method of choice, unless there are special contraindications. W. A. BARNHART.

SURGICAL DIAGNOSIS, PATHOLOGY AND THERAPEUTICS

Sibley W. K. The Treatment of Scars. *Practitioner* Lond. 9, 6, 1914, 637.

The most frequent causes of scars are injuries, surgical operations, burns, tuberculous and other ulcerating skin diseases, acne, and variola. Scar tissue, because of its avascularity is not affected by drugs taken internally, but may be locally influenced by physical and electrical agents.

Hyperemia with Bier's suction cups will improve depressed, irregular and adherent scars and tend to convert avascular into vascular tissue. Scarring from both acne and smallpox is benefited by this treatment. Other methods of increasing hyperemia are the use of radiant heat, moist or dry hot air and hot or cold compresses, all of which are serviceable for the relief of pain and for the production of hyperemia.

Massage is most useful in freeing adherent scars from deeper structures.

3. Desquamating agents, such as salicylic acid or resorcin from 5 to 30 per cent strength, may be used to smooth down raised scars.

4. Electrical treatments, of which there are several forms, often give satisfactory results. By means of ionization soluble drugs are driven into the scar tissue. Sodium chloride, sodium salicylate, and iodine are the drugs used. Small repeated doses of X-rays may be cautiously used on hypertrophic scars, especially if they are keloid in nature. Radium also causes scars to become smooth and movable and relieves pain. High-frequency currents may be given locally or generally. Galvanism restores the tone of adjacent muscles and thus increases movement of the parts.

5. Of drugs used locally there are two: (1) fibrolysin, which consists of a 15 per cent solution of combined thiosulphate and sodium salicylate, 40 minims of which may be injected every two or three days into the gluteal region or around the affected tissue and (2) dicatrine (thiosulphate and antipyrine) which is stated to be non-toxic and non-irritating, the dose for injection being from 8 to 17 minims. E. K. ARMSTRONG.

EXPERIMENTAL SURGERY AND SURGICAL ANATOMY

Dubois E. F.: Metabolism in Exophthalmic Goiter. *Arch Int Med* 1916 xvii 915

In contrast with the symptoms on the part of the nervous system the heart and eye symptoms which vary greatly in this disease an increased basal metabolism was found by Dubois with great regularity in exophthalmic goiter which in severe cases, he states reaches a level found in no other condition. On the other hand, in cretinism and myxedema he found the metabolism lower than in any other diseases. The administration of thyroid extract, particularly in myxedema, raises the heat production. All other diseases in which metabolism is increased are easily distinguishable from exophthalmic goiter and they never approach the extremes found in this condition. The basal metabolism is higher than normal in youth, in fever in lymphatic leukemia, and in pernicious anemia, in severe cardiac disease and in some cases of severe diabetes and cancer. It is lower than normal in old age and in some wasting diseases and perhaps in some cases of obesity. Diseases of the ductless glands other than thyroid show in some cases an increase, in some a decrease but these are comparatively small.

From the author's experiments and observations in a large series of cases he was able to make the following summary of his work.

The metabolism in exophthalmic goiter has been studied for the first time in a respiratory apparatus which is also a calorimeter. Thirty-seven observations were made on eleven patients with this disease and six experiments were made on a cretin. With some of the patients the nitrogen balance was also studied.

The measurement of the heat production gives the best index of the severity of the diseases, and of the effect of treatment. Very severe cases show an increase of 75 per cent or more above the normal average severe cases 50 per cent or more, and moderately severe and mild cases less than 50 per cent while a few mild and several atypical cases or those in which operation has been performed may be within normal limits. In severe cases the warmth of the skin and sweating can be accounted for entirely by the necessity for the increased elimination of heat. At least a part of the tachycardia is due to the increased metabolism and perhaps it might be possible to reproduce the extreme tachycardia, the cardiac enlargement emaciation and mental irritability if it were possible to stimulate the metabolism of normal men for twenty-four hours a day over a period of months or years.

The specific dynamic action of protein and of glucose is within normal limits and there is no consistent difference between the effects of protein in meat and an equal amount in milk and eggs. One patient was able to derive 89 per cent of his calories from carbohydrate in an experiment when he was

showing an alimentary glycosuria. There is evidently no interference with the oxydation of carbohydrates.

The methods of direct and indirect calorimetry agree very closely when the technical difficulties are considered. The method of direct calorimetry gave results which were slightly lower than the indirect the total difference being 2.9 per cent the average difference in the individual being 4.1 per cent. This and the absence of abnormal respiratory quotients show that the law of the conservation of energy holds good in exophthalmic goiter and that there is no profound disturbance of the intermediary metabolism.

The average water elimination through the skin and lungs in the severe and moderately severe cases of hyperthyroidism is 39.0 grams per hour. The increase above the normal is closely proportional to the increase in heat production 25.7 per cent of the calories are dissipated through vaporization in goiter patients whereas the mean normal is almost the same 23.9 per cent.

The level of the heat production was used as an index of the effect of medical treatment. Rest in bed for a week or more caused a drop of more than 10 per cent. The effects of treatment with Beebe's serum thyroid residue, ergotin, and quinine hydrobromate was less marked each being tested on one patient. Ligation of the thyroid arteries with three out of the four patients studied caused a distinct rise in metabolism, the duration of which was uncertain. There is as yet no proof the author states, that any conservative form of treatment causes a greater reduction of metabolism than mental and physical rest.

One small cretin 36 years old produced about half the calories eliminated by children of his size. As estimated by the surface area his metabolism was about 30 per cent below the normal adult level. Three and a half days treatment with thyroid extract raised his heat production to normal.

GEORGE E. DEILBY

Dewey K.: Experimental Hypercholesterolemia. *Arch Int Med*, 1916 xvii 737

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all these problems await further investigations. Nevertheless it is believed that certain conclusions may safely be drawn from his observations. They furnish a further corroboration of what may now be accepted as a fact that there is in the words of Bayliss a complete chemical regulation of the cardiovascular system which may act independently from the central nervous system. It has been shown in this paper that it is not only the blood circulating in the blood vessels that takes part in the regulation of their functions, but that the chemical conditions of the tissues and fluids surrounding the blood vessels also exercise an important influence. It appears furthermore that it is not only the products of the internal secretions which are concerned in this but that common acids and alkalies the specific metabolites of the tissues and cells besides a number of neutral salts, under ordinary circumstances for eign to the organism, may exercise a controlling influence. Strong acids act like alkali in compelling vessels to contract. It is true that such extreme chemical changes as have been presented in this paper are not ordinarily likely to occur. Rowntree and his associates estimate the hydrogen ion concentration of normal human blood-plasma as varying from $pH=7.4-7.6$ of the blood serum from $pH=7.6-7.8$. In clinical acidosis $pH=7.3-7.1$ and in dogs just before death from experimental acidosis $pH=6.9$. Henderson has shown that the blood is able to dispose of considerable quantities of alkali or acid without much change in its reaction. There must necessarily however be a limit to this, and one may conclude from the observations recorded by the author that besides the chemical and physical reactions of the blood itself there are other chemical and physical factors which, when once a certain limit has been overstepped, may lead to grave disturbances of circulation, and one can easily conceive of certain pathological processes such as inflammations, thromboses, necroses, and other local, possibly even systemic, affections originating in this manner.

GEORGE E. HEILAY

Auer, J., and Gates, F. L.: The Absorption of Adrenalin After Intratracheal Injection. *J. Exp. Med.* 1916 xxiii, 757.

In order to subject a living organism to the systematic action of any soluble substance it is obvious that the substance must first reach the circulating fluids of this organism, from the lymph and blood streams the drug may then pass into the tissues and exert its effect. The main routes available for bringing any substance into contact with the tissues are as follows: (1) by introduction into the gastrointestinal canal (2) by subcutaneous intramuscular intravenous, or intraspinal injection (3) by incision through the skin, and (4) through the respiratory tract.

Auer and Gates purpose in this paper has been to test the possibilities of the respiratory route and they have submitted evidence of an experimental nature which shows that a simple intratracheal in-

jection of a solution in a normally breathing rabbit penetrates within a few seconds to the alveoli chiefly those of the left lower lobe that absorption is rapid and well maintained and that the procedure may be repeated effectively a number of times even with a substance like adrenalin which decreases absorption. It was also shown that absorption of adrenalin from the lung could be obtained at a time when double the dose given intramuscularly exerted no blood-pressure effect whatever and that absorption could still take place after the development of pulmonary edema, when there was an undoubted dilution of the injection solution with a serum-containing liquid and when a diminution of the absorptive field had occurred.

The solution injected after reaching the alveoli is probably largely taken up by the capillaries of the pulmonary veins. This is indicated by the great rapidity with which an intratracheal injection of adrenalin may cause a rise of blood-pressure. In numerous instances for example the pressure began to rise less than five seconds after the completion of an injection, equaling, and even surpassing in rapidity of effect intramuscular injection. Absorption by the lymphatics probably plays a secondary part, an assumption rendered all the more likely when it is considered that lymph nodes are interpolated in the lymphatic pulmonary path, where the bed of the lymph stream becomes greatly widened and the current slowed.

Injection into the lungs, however offers another advantage due to the vascular arrangement of the absorbing field which could be of value therapeutically. Absorption of liquids injected into the lung probably takes place largely through the capillaries of the pulmonary veins to a slight extent possibly through the capillaries of the bronchial veins which empty partly into the pulmonary veins, partly into the azygos veins, and probably some absorption occurs also through the lymphatics. By far the larger portion of the absorbed material will thus be rapidly delivered to the left auricle and then to the left ventricle. At each succeeding systole, as long as absorption continues a fraction of the drug will be driven into the coronary arteries and be able to affect the musculature of the cardiac pump. This fact the authors state, ought to render the procedure of intratracheal injection a valuable method when it becomes imperative to stimulate a suddenly failing heart as promptly as possible by drugs of the digitalis group.

Intratracheal injection is perhaps better under the conditions mentioned than the intravenous route for the surface veins cannot always be entered with promptness and certainty even under fairly normal conditions and in cases of cardiac weakness the difficulties will be measurable increased while an intratracheal injection can be carried out with ease. Moreover the authors state it is legitimate to expect that some absorption will take place from the lung alveoli as long as the heart lung circulation persists no matter how feebly and that thus some

all these problems await further investigations. Nevertheless it is believed that certain conclusions may safely be drawn from his observations. They furnish a further corroboration of what may now be accepted as a fact that there is in the words of Bayliss, a complete chemical regulation of the cardiovascular system which may act independently from the central nervous system." It has been shown in this paper that it is not only the blood circulating in the blood vessels that takes part in the regulation of their functions, but that the chemical conditions of the tissues and fluids surrounding the blood vessels also exercise an important influence. It appears furthermore that it is not only the products of the internal secretions which are concerned in this, but that common acids and alkalies, the specific metabolites of the tissues and cells besides a number of neutral salts under ordinary circumstances for eign to the organism may exercise a controlling influence. Strong acids act like alkali in compelling vessels to contract. It is true that such extreme chemical changes as have been presented in this paper are not ordinarily likely to occur. Rowen and his associates estimate the hydrogen-ion concentration of normal human blood plasma as varying from $pH=7.4$ to 7.6 of the blood serum from $pH=7.6$ to 7.8 . In clinical acidosis $pH=7.3$ to 7.1 and in dogs just before death from experimental acidosis $pH=6.9$. Henderson has shown that the blood is able to dispose of considerable quantities of alkali or acid without much change in its reaction. There must necessarily however be a limit to this and one may conclude from the observations recorded by the author that besides the chemical and physical reactions of the blood itself there are other chemical and physical factors which when once a certain limit has been overstepped, may lead to grave disturbances of circulation, and one can easily conceive of certain pathological processes such as inflammations, thromboses, necroses, and other focal possibly even systemic, affections originating in this manner.

GEORGE E. BAILEY

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In order to subject a living organism to the systematic action of any soluble substance, it is obvious that the substance must first reach the circulating fluids of this organism from the lymph and blood streams the drug may then pass into the tissues and exert its effect. The main routes available for bringing any substance into contact with the tissues are as follows: (1) by introduction into the gastrointestinal canal (2) by subcutaneous intramuscular intravenous or intratracheal injection (3) by incision through the skin, and (4) through the respiratory tract.

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The solution injected after reaching the alveoli is probably largely taken up by the capillaries of the pulmonary veins. This is indicated by the great rapidity with which an intratracheal injection of adrenalin may cause a rise of blood pressure. In numerous instances for example the pressure began to rise less than five seconds after the completion of an injection, equalling and even surpassing in rapidity of effect intramuscular injection. Absorption by the lymphatics probably plays a secondary part, an assumption rendered all the more likely when it is considered that lymph nodes are interpolated in the lymphatic pulmonary path, where the bed of the lymph stream becomes greatly widened and the current slowed.

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Intratracheal injection is perhaps better under the conditions mentioned than the intravenous route, for the surface veins cannot always be entered with promptness and certainty even under fairly normal conditions and in cases of cardiac weakness the difficulties will be measurably increased while an intratracheal injection can be carried out with ease. Moreover the authors state it is legitimate to expect that some absorption will take place from the lung alveoli as long as the heart lung circulation persists no matter how feeble and that thus some

tissue cultures had been obtained from this animal. During the present experiments 31 animals were used and a total of 50 operations were performed. The process of wound healing was studied at various stages both in the living animals and in the preserved material.

The experiments reported in the present paper demonstrate that in wounds made in the skin of adult frogs there occurs as has previously been shown to be the case in living cultures of adult frog tissues, a direct transformation of the fibrin-clot into a new fibrous tissue without any intracellular action. This newly formed fibrous tissue which fills the wound space is apparently identical in appearance, structure, function, and staining reactions with regularly formed permanent connective tissue. It differs from adult connective tissue in the kind of the frog in its reaction with pancreatin digestion. No ever this test as well as all others that have so far been tried, fails to differentiate between the new fibrous tissue and young connective tissue found in diploles of various ages.

In experimental wounds made by removing various sized pieces of skin from the frog the rapid coagulation of the blood plasma and lymph to form a coagulation tissue which fills the wound cavity.

Observations on living animals show that the coagulation tissue becomes more and more resistant and is generally of sufficient strength to hold the edges of the wound in place and to maintain position in the wound cavity. It serves, at least temporarily as a connective tissue and as a base for the epithelial cells which rapidly move in from all the cut edges and cover the wound.

The study of the prepared sections of wound tissue show that at first the coagulation tissue formed as a result of the clotting of blood and lymph a typical fibrin net is present in the wound. Later this fibrin net is transformed into a new fibrous tissue containing bundles of wavy fibers in which in many instances the individual fibrils can be noted. This transformation of the clot and the formation of the new fibrous tissue takes place before the tissue-cells wander into the coagulation tissue and therefore cannot be due to an intracellular action. It is a direct transformation of the fibrin-clot and is identical with the process which was previously found to take place in the fibrin-clots in living cultures of adult frog tissues.

The tissue cells, which later migrate into the new fibrous tissue in large numbers from the surrounding area, do not digest the fibrin but apparently by their movements, cause a disintegration of the large bundles into smaller ones. These cells when they first appear in the fibrous tissue are rounded, but later they assume the typical elongated spindle shape of fibroblast cells. The preparations do not show any connection between these spindle-shaped cells and the fibers which had already formed, nor is there any evidence of a later attempt by them to form new fibers intracellularly.

The staining reactions of the new fibrous tissue appear to be identical with the staining reactions of the connective tissue in frog skin. However, the new tissue can be digested in pancreatin and in this reaction it differs from the connective tissue in the skin of the adult frog. On the other hand, it stains identically with pancreatin on embryonic but fully formed connective tissue obtained from the tail and skin of tadpoles of various ages, showing that pancreatin will digest it just as it does the newly formed fibrous tissue. (GEORGE E. BATES)

After 1. Some Reaction of Blood Vessels to Certain Chemicals. *J. Pharmacol. & Exp. Therap.* 9: 6, 11, 107

Aside from the fact that the various tissues and organs of the body receive from the circulating blood such material they require for their nutrition and for their growth, on the other hand must necessarily discharge some of the products of their metabolism into the interstitial tissue and its lymph-spaces. The blood vessels are therefore likely to be steeped in media more or less unstable, their chemical composition and arising widely in different regions of the body and must be assumed a priori that the vascular system reacts in certain definite ways to the physical and chemical changes that are more or less continuously taking place around about it. The study of the effects of chemical reagents of the products of glandular secretion on the action of drugs upon the heart and the blood vessels, especially upon the arteries has been mainly carried out by methods of perfusion. The direct observation of the living vessels under varying mechanical, thermal, electrical, and chemical conditions has received comparatively little attention.

The study of the reaction of the vessels was done mainly on the frog, using principally the mesentery and the reagent employed were dissolved in a 0.75 per cent saline solution and applied by means of a small glass tube holding rubber bulb at one end and the other drawn out into a moderately fine capillary. He presents a detailed description of the reaction observed by the use of alkalies and of acid solutions.

Summing up his results the author seems to be fully conscious that there still remain sufficient problems that have not been solved and discrepancies that have not been reconciled. The curiously uneven and apparently irregular contraction of the vascular walls, which they call beading demands further investigation and explanation, he believes. The fact that cleansing the mesentery with filter or lint paper in one instance causes no disturbance

however and that again violent constrictions may follow the same manipulation, though suggesting several plausible hypotheses, has not attained a precise explanation in his opinion. Similarly it has often been observed that acid solutions (alkaline not so frequently) had apparently no effect until the mesentery was washed with normal saline when the constrictions promptly appeared. Here again, he states, several explanations suggest themselves, but

all these problems await further investigations. Nevertheless it is believed that certain conclusions may safely be drawn from his observations. They furnish a further corroboration of what may now be accepted as a fact that there is in the words of Bayliss a complete chemical regulation of the cardiovascular system which may act independently from the central nervous system. It has been shown in this paper that it is not only the blood circulating in the blood vessels that takes part in the regulation of their functions, but that the chemical conditions of the tissues and fluids surrounding the blood vessels also exercise an important influence. It appears furthermore that it is not only the products of the internal secretions which are concerned in this, but that common acids and alkalies, the specific metabolites of the tissues and cells besides a number of neutral salts under ordinary circumstances for elga to the organism, may exercise a controlling influence. Strong acids act like alkali in compelling vessels to contract. It is true that such extreme chemical changes as have been presented in this paper are not ordinarily likely to occur. Rowntree and his associates estimate the hydrogen-ion concentration of normal human blood plasma as varying from $\text{pH} = 7.4$ to 7.6 of the blood serum from $\text{pH} = 7.6$ to 7.8 . In clinical acidosis $\text{pH} = 7.3$ to 7.1 and in dogs just before death from experimental acidosis $\text{pH} = 6.9$. Henderson has shown that the blood is able to dispose of considerable quantities of alkali or acid without much change in its reaction. There must necessarily however be a limit to this and one may conclude from the observations recorded by the author that besides the chemical and physical reactions of the blood itself there are other chemical and physical factors which when once a certain limit has been overstepped may lead to grave disturbances of circulation, and one can easily conceive of certain pathological processes such as inflammations, thromboses, necroses and other local possibly even systemic, affections originating in this manner.

GEORGE E. BRILL

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Auer and Gates purpose in this paper has been to test the possibilities of the respiratory route and they have submitted evidence of an experimental nature which shows that a simple intratracheal in-

jection of a solution in a normally breathing rabbit penetrates within a few seconds to the alveoli chiefly those of the left lower lobe, that absorption is rapid and well maintained and that the procedure may be repeated effectively a number of times even with a substance like adrenalin which decreases absorption. It was also shown that absorption of adrenalin from the lung could be obtained at a time when double the dose given intramuscularly exerted no blood-pressure effect whatever and that absorption could still take place after the development of pulmonary oedema, when there was an undoubted diffusion of the injection solution with a serum-containing liquid and when a diminution of the absorptive field had occurred.

The solution injected, after reaching the alveoli is probably largely taken up by the capillaries of the pulmonary veins. This is indicated by the great rapidity with which an intratracheal injection of adrenalin may cause a rise of blood pressure. In numerous instances for example the pressure began to rise less than five seconds after the completion of an injection equaling and even surpassing in rapidity of effect intramuscular injection. Absorption by the lymphatics probably plays a secondary part, an assumption rendered all the more likely when it is considered that lymph nodes are interpolated in the lymphatic pulmonary path, where the bed of the lymph stream becomes greatly widened and the current slowed.

Injection into the lungs, however offers another advantage due to the vascular arrangement of the absorbing field which could be of value therapeutically. Absorption of liquids injected into the lung probably takes place largely through the capillaries of the pulmonary veins to a slight extent possibly through the capillaries of the bronchial veins which empty partly into the pulmonary veins partly into the azygos veins and probably some absorption occurs also through the lymphatics. By far the larger portion of the absorbed material will thus be rapidly delivered to the left auricle and then to the left ventricle. At each succeeding systole, as long as absorption continues, a fraction of the drug will be driven into the coronary arteries and be able to affect the musculature of the cardiac pump. This fact the authors state ought to render the procedure of intratracheal injection a valuable method when it becomes imperative to stimulate a suddenly failing heart as promptly as possible by drugs of the digitalis group.

Intratracheal injection is perhaps better under the conditions mentioned than the intravenous route for the surface veins cannot always be entered with promptness and certainty, even under fairly normal conditions and in cases of cardiac weakness the difficulties will be measurable increased while an intratracheal injection can be carried out with ease. Moreover the authors state it is legitimate to expect that some absorption will take place from the lung alveoli as long as the heart-lung circulation persists no matter how feebly and that thus some

of the drug will reach the heart to act on this structure itself more promptly perhaps than when the drug is administered successfully through surface veins. As far as the intramuscular route is concerned they have shown that the intratracheal injection of adrenalin gives prompt though diminished absorption at a time when double the dose intramuscularly exerts a blood pressure effect whatever.

The technical difficulties of performing intratracheal injection in animals are slight. Traheostomy as practiced by the thoracic pressurization experiments, is not necessary for the injection may be given into the intratrachea without exposure of the trachea. The hypodermic needle is inserted through the skin about 1 cm below the larynx in a slanting caudad direction the entrance of the needle into the trachea being readily felt. The injection should not be so rapid that the injected solution fills the entire tracheal lumen but it should flow down the sides of the trachea. If the lumen is completely filled an expiration may drive some of the injected fluid into the larynx causing cough. In the thoracic experiments each injection of about 0.5 c.c. completed approximately five seconds.

In the human subject data are available that the thoracic rate as far as their knowledge goes but a few others it would seem that intratracheal injection is almost as simple as the lower route. The free hypodermic needle could be inserted into the tracheal lumen immediately below the cricoid cartilage. The needle itself should preferably be connected with the syringe by a short length of rubber tubing to minimize the danger of breaking the needle by a sudden move of the patient. The amount of the solution should not be too small so that at least a fraction of the material has the alcohol as promptly as possible 3 to 5 c.c. probably would suffice.

In conclusion it may be said that the intratracheal injection of drugs by intratracheal injection while not as generally applicable as other methods nevertheless has advantages which warrant its use also in human therapeutics. GORDON E. BARTER

Piglihi, G. The Alterations in the Endocrine of the Gland, Especially the Thyroid, and of the Blood Following Vagotomy (Le alterazioni della ghiandola endocrina, specie del timo e del sangue in seguito alla vagotomia). *Riv. per il fascist. med. leg.* 9 6 XII, 549.

In his researches on the effects of thymectomy on the pig, Piglihi noticed that in some animals in which the two pneumogastric nerves were accidentally sectioned grave dyspnoea and cachexia were produced followed after a few days by death. The most characteristic findings at the autopsy were similar to those found in animals which died in cachexia after thymectomy i.e. dyspnoea, cachexia, venous stasis in many organs, splenic anaemia, great increase in the volume of suprarenal capsules, especially the chromaffin parts.

This coincidence led him to undertake further

studies, particularly to find if similar effects might follow a lesion of the vagus whether or not accompanied by a thymectomy. He therefore carried out a series of experiments on fowls and guinea pigs sectioning the vagus in the vicinity of the neck and studying the clinical syndrome as well as making detailed macro- and microscopical autopsy studies. These studies with the technique described in detail and from them the author deduces the following conclusions.

Fowls do not survive vagotomy more than four to five days guinea pigs about the same time.

Among the effect of vagotomy a clear distinction must be made between those which depend on the altered rhythm of the respiration and circulation with relative spasms of many viscera and a final asphyctic state and those which are directly imputable to the cessation of the action of the vagus innervation on certain glandular or systemic organs. The first effect results in the abolition of the vagus function on the respiration centers and vessels and the second from the suppressed innervation of the vagus upon organs which had a direct functional correlation with the vagus.

1. Among the organs which react directly to vagotomy are the hypophysis the thyroid the chromaffin gland of the capsule which is seen, especially the last named to be in a state of hyperfunction the thymus and spleen which show atrophic processes, especially the thymus which in fowls causes a marked lipoid degeneration the interrenal cortical of the capsule the internal of the ovary and testicle the medullary of the long bones which shows alteration in lipid content the circulating blood shows an abnormal distribution of white corpuscles, a preponderance of neutrophils, and a notable diminution of eosinophiles.

2. The thymus the spleen, the cortical of the capsule the interstitial of the testicle and ovary and the osseous medullary have an exchange and an internal secretion which is in part regulated by the autonomous action of the vagus.

3. The vagus being suppressed, the functions of these organs are consequently diminished, and the sympatheticus tonus is increased which is manifested by the hyperfunctioning of the chromaffin gland of the capsule (and in a lesser degree of the thymus and hypophysis) and in the increase of adrenalin substance in the circulating blood. W. A. BRIDGMAN

RADIOLOGY

Moriarty, D. C. Radium a Palliative Treatment of Ovarian Cancer. Indianapolis 9 6 Sept.

After a limited experience with a small amount of radium in the relief of the symptoms of terminal cancerous conditions of the female breast and pelvis, the author reports six cases in which the pain and hemorrhage had been alleviated. He also mentions that other clinical workers in radium have reported the same results without emphasis, however on its usefulness in this particular field. The

author states that he has made no claim to cure or prolongation of life, simply the alleviation of the symptoms. A synopsis of the cases reported shows that pain was relieved that the odor was markedly controlled, and that hemorrhage ceased. Two died in coma, two months after treatment. Four are alive and hopeful at the present time.

Morlanti believes it possible to produce a toxemia with radium locally which may prove serious, and suggests two precautions when using radium locally. First, a patient with a low leucocyte count should not be given prolonged applications of radium. Second when radium is used locally it should be accompanied by the liberal administration of alkalis. The author worked with only 25 milligrams of radium element, but for periods varying from 250 milligram hours to 9 600 milligram hours continuously. His convictions are that no case of this type is so desperate and no post-operative condition so hopeless that radium should not be used with an expectation of the alleviation of the trying symptoms.

Crosby L. G.: Deep Roentgen Therapy of Benign and Inoperable Malignant Conditions by Improved Technique. *Cole Med* 19 6 xiii, 183.

After brief mention of those physical characteristics of the roentgen rays which are factors in their use as a therapeutic agent, the author describes the chief differences between the technique employed in present-day deep roentgen therapy and that in use prior to two years ago. To the use of Coolidge tubes, filters, accurate devices for measuring dosage and the cross-fire method of treatment he ascribes the very much better results which can now be obtained.

In common with various authors whose reports he cites he has been able to obtain marked improvement or symptomatic cure in a large percentage of deep-seated lesions treated. He concludes that the roentgen ray should be used in all cases of inoperable malignant disease that its post-operative use in malignant cases be universally resorted to that it is a valuable adjunct to other lines of treatment in Gravel disease, splenic leukemia, and Hodgkin's disease and that in menorrhagia and myomatia it be employed in any case in which operation seems ill advised.

ADOLPH HARTMAN

Hirsch I. S.: Roentgenographic Control of the Pneumothorax Treatment of Pulmonary Tuberculosis. *Med Rec* 1916 lxxix 1029.

The application of the roentgen method assists in the selection of cases, permits the estimation of the degree of collapse and of the effect on the opposite of lung. Indicates graphically the displacement of the heart and mediastinum and aids the early discovery of complications.

It appears almost impossible by physical examination to determine the extent of the pneumothorax the position of the collapsed lung or to estimate the displacement of mediastinal structures. These dif-

ficulties demand all the diagnostic means at our disposal.

Both methods roentgenoscopic and roentgenographic, should be employed. With either omitted the examination is incomplete. No description of the fleeting image seen on the fluorescent screen however accurate, can compare as a graphic record with the permanent plate which also gives the finer structural detail not to be seen with the screen.

Roentgen study is made at three periods (1) preliminary for the estimation of the amount of disease (2) during and immediately after the injection and (3) later to determine the amount of the collapse restitution etc.

There appears to exist a belief that opening of the pleura and the admission of air invariably results in immediate and complete collapse of the lung, but it has been demonstrated that the lungs may functionate while there is a large pleural opening and that considerable quantities of gas are necessary to obtain extensive collapse.

Examination after injection gives the following data

- 1 The degree of pneumothorax. Is the air present in all parts of the pleural cavity or confined to a particular part?
- 2 The complete or partial collapse of the lung and its mobility
- 3 Presence or absence of pleural effusion.
- 4 Degree and manner of mediastinal displacement. Is there excessive strain on the blood vessels? (The heart displacement is not proportional to the amount of gas injected and varies with the same amount of gas.)
- 5 The movement and displacement of the diaphragm.
- 6 Subcutaneous emphysema presence and degree
- 7 Restitution and reinflation.
- 8 The effect may be studied from time to time and comparisons made.

DAVID R. BOWEN

Clark, W. L.: The Treatment of *Nævus Flammeus* and Allied Conditions by Filtered Ultraviolet Rays, Employing the Compression Method of Application. *Therap Gaz* 1916 xl 312

Ultraviolet rays, as applied by the author were found most efficacious in the treatment of port wine *nævus*, lupus erythematosus, *eczema rubrum* and *acne rosacea*. He used a Kromayer modification of the Cooper Hewitt mercury vapor lamp for generating the rays which were passed through quartz lenses cooled by a continuous circulation of water. He found the interposition of a thin disk of blue colored quartz of decided advantage, this acting as a filter for the irritating wave lengths and increasing the penetration.

The tissues treated were firmly compressed to produce a temporary ischemia and the surrounding structures were protected by the use of zinc-oxide adhesive plaster which effectively cut off the rays. An application of 30 to 40 minutes was found to pro-

duce the maximum of beneficial results. This was repeated, if necessary after three weeks and some cases required a third or fourth application after a similar interval.

A few hours after treatment a reaction set in. First the area treated became slightly darker and moderately swollen and edematous. This reaction became more intense for about 48 hours and then began to subside. Slight desquamation of the skin occurred and after one or two weeks the nevus became markedly lighter in color. Similar results followed each treatment although to a lesser degree. Brunettes were found less susceptible than blondes. Children reacted more favorably than adults. The best results were obtained with those nevi which faded readily upon pressure. Where connective tissue hypertrophy was present absolute obliteration rarely occurred but marked improvement resulted.

Ten cases of port wine nevi thus treated are cited in detail with results varying from slight improvement to complete success. Partial failure in two cases was ascribed to a coating of carbon on the quartz lenses, and a word of caution is given to avoid this. In some of the cases having scars due to previous treatment marked improvement of the scar followed the ultraviolet light treatment. Enlargement of feet res due to blood engorgement complicating some of the cases was materially reduced.

The author concluded that filtered ultraviolet rays applied by the compression method produces good cosmetic results in the treatment of port wine nevi telangiectasis, rosacea, and other superficial vascular skin lesions. A. HARTMAN.

Burns, J. E. Thorium, A New Agent for Pyelography. *Bull. John B. Pines Hosp.* 9 6 XVII, 57.

Ever since the introduction of pyelography by Voelker and von Lichtenberg in 1906 its prime importance in the rôle of renal diagnosis has readily been recognized. Although various attempts have been made to replace collargol the medium recommended by them for injection, it has proven to be the pyelographic agent par excellence up to the present time. The various colloidal solutions of salts of heavy metals, which have been tried as substitutes, are those of silver, iron, bismuth, copper, lead and mercury as have suspensions of the salts of bismuth, calcium, and magnesium. All of these solutions form sediment at once and while being for the most part quite opaque to the roentgen ray are viscous moreover great many are quite toxic and irritating.

The chief objection to collargol is its irritant action when it escapes into the tissues, and, as a matter of fact, there have been a number of deaths reported following its use. Its elimination from the urinary tract is somewhat prolonged on account of its viscosity. The fact that it stains everything with which it comes in contact makes it objectionable. It

is also quite expensive for this reason its use for cystograms and large hydronephroses is often prohibitive.

Since the opacity of a substance to the roentgen ray depends upon its atomic weight, thorium, being next to the heaviest known element, was quite ideal theoretically and seemed worthy of careful investigation. The nitrate and chloride of thorium are quite readily soluble in water giving a clear, markedly acid and astringent solution. These solutions, however, are quite irritating and it was necessary for the authors to discover some means of combining the substance to render a less irritating product.

After a careful series of chemical studies of the various combinations into which thorium may enter, a solution containing a double citrate of sodium and thorium, together with an excess of sodium citrate and some sodium nitrate, was found to possess the qualities desired as being necessary for an ideal pyelographic medium. After a careful clinical and experimental study the authors conclude as follows:

Thorium solution fulfills all the conditions necessary for an ideal pyelographic medium. Clinically there has never been the slightest evidence of toxicity in a series of one hundred and twenty-five cases, the amounts used in single case varying from a few cubic centimeters to almost a liter. This alone is proof of its non-toxicity.

Experimentally although in a few instances death has followed the injection of large doses into the peritoneal cavity and tissues of animals, larger doses intraperitoneally and intravenously have produced no ill effects. That the solution is non-irritating is shown by the absence of urinary symptoms after its use, and the absolute lack of any such evidence cystoscopically and at operation.

The pyelograms and cystograms made with this solution show a splendid shadow which possesses an unusual clearness of delineation. The solution is clear and watery therefore it possesses a great degree of fluidity permitting its ready elimination from the urinary tract. It is perfectly clean and does not stain the linen. In this particular it possesses another marked advantage over other solutions, particularly those of the silver salts. It is quite inexpensive, being about one-third as expensive as collargol. GEORGE E. BRIDLEY.

MILITARY SURGERY

Metcalf, J. and Keys-Wells, E. N. The Anatomical Position of Localized Foreign Bodies. *Lancet* Lond. 9 6 CIV, 978.

The localization of foreign bodies has been greatly simplified with the improved methods. Many cases arise, however, where it is important to know what structures lie above or below a foreign body. For example, in the thick parts of the body it may not be possible to secure satisfactory pictures in two planes. It is therefore necessary to estimate the depth of the foreign body in centimeters and this can usually be done. The question as to the relations

of the foreign body are not greatly simplified, however unless the depths at which anatomical structures lie are known by the surgeon. For example the radiographer reports a bullet to be 9 centimeters deep from a mark on the front of the thigh over the great trochanter. If the surgeon knows that the average depth from the skin to the great trochanter anteriorly is 10.8 centimeters and from the back 9 centimeters he would be justified in concluding that the foreign body lay just in front of the trochanter.

The author has tabulated a careful list of different parts of the body with the corresponding depths at which the different structures are placed beneath the surface.

J. H. SKILES

Dehelly and Dumas: Sterilization of War Wounds (Stérilisation des blessures de guerre) *Presse méd.* 1916 p. 203.

The authors give the technique of their treatment for the rapid disinfection of war wounds. They use a solution of 1:200 of hypochlorite of sodium prepared according to Dakins method. The special technique for obtaining access to the deeper parts of wounds is described. The treatment comprises surgical intervention, continuous instillation, and careful after treatment. Intervention is done aseptically as under operative conditions and following this it is necessary that all parts of the wound be kept in permanent contact with the antiseptic solution. For closure of the wound the authors prefer adhesive strips to sutures.

Of 155 cases of extensive wounds due to shells, bombs, and mines which have been treated by this method 135 or 87.4 per cent have closed. Of these 119 were cicatrized in less than 30 days. Twenty five of the 155 cases were complicated with fractures and of these 18 were cicatrized in less than 30 days.

W. A. BRENNAN

Fleminger Moiroud Nimier and Vignes Study of Pus in War Surgery by the Pyoculture Method of Delbet (Étude sur le pus en chirurgie de guerre par la méthode de la pyoculture du Delbet) *Presse méd.* 1916 p. 197

The authors have studied the method of pyoculture in a surgical field ambulance and their experience is based on 120 practical tests in different types of war wounds. They have endeavored to ascertain whether pyoculture could determine the kind of operative intervention.

They find that a positive pyoculture does not suffice to indicate intervention thus in 58 per cent of their cases a positive pyoculture was followed by a normal evolution of the wound without intervention. The necessity for intervention is only marked in 33 per cent of the cases. On the other hand when the pyoculture is nil or negative, it does not always indicate that intervention will not be necessary. Thus in 13 per cent of the cases, where the pyoculture was nil or negative intervention was necessary. In the presence of a pyoculture which is nil or nega-

tive expectant treatment may be advised but it may be necessary to resort to operation.

W. A. BRENNAN

Proust R. Considerations on Some War Injuries After Eighteen Months of Campaign (Considérations sur quelques plaies de guerre après dix huit mois de campagne) *Bull. et mém. Soc. de chir. de Par.* 1916 XLII, 1970.

Proust submits some general ideas gained from eighteen months experience in field ambulances. From May 1915 to February 1916 while in charge of Surgical Automobile Ambulance No. 1 Proust cared for 1,800 wounded, most of which had severe, infected wounds. The mortality was 23 per cent.

In injuries to veins or arteries the author ligates the vessel some distance above and below the injury and resects the injured part.

In bone lesions free splinters of bone should be removed but care must be used as regards other lesions.

For articular wounds, Proust believes that when any articulation is traversed by a projectile other than a bullet the opening must be largely widened so as to ensure drainage and certain resections such as of the patella and astragalus may have to be resorted to. Patellectomy has given 15 recoveries in 19 grave wounds of the knee. 16 shoulder resections gave 14 recoveries. Operatory indications are exceptional for nerve-resections.

In the case of wounds which are difficult of disinfection even after free opening up Carrel's method i.e. intermittent instillation of freshly prepared Dakin's solution has given the best results.

When amputations are necessary Proust always resorts to plane section. In the 1,800 wounded treated there were 152 amputations with a global mortality of 15 per cent distributed as follows:

3 thigh amputations	47	per cent mortality
5 leg amputations	5	per cent mortality
9 foot amputations	3	per cent mortality
20 arm amputations	7	per cent mortality
4 forearm amputations	2	per cent mortality

The mortality however has decreased under better conditions, etc. Thus from June to July the mortality was 72 per cent from September to November 32 per cent from December to January 20 per cent.

W. A. BRENNAN

Freund II: Experiences with Gaseous Gangrene in War Surgery (Kriegschirurgische Erfahrungen bei Gasgangrän) *Beitr. z. klin. Chir.*, 1916 xciv, 447.

Freund gives his experience with gas gangrene based on the treatment of 39 cases, 10 of which were of the epifascial type and 29 deep muscular tissue gangrene.

The history of gas gangrene is traced since Velpeau first made observations on the condition in 1855 and since the discovery of the gas bacillus by Fraenkel in 1883. The epifascial form of gas gangrene gives its indications between the skin and the

fascia. The typical discoloration of the skin, the intense edema, the changes in the subcutaneous tissues, and the finding of the gas bacillus are characteristic. This epithelial form is sharply differentiated from the subfascial muscular form and may be considered a distinct entity. The specific symptoms appear on the third or fourth day.

The subfascial form of gas gangrene is distinguished by the unusually violent halting pains in the wound remarkably accelerated pulse and great unrest of the patient. The clinical picture is not occasioned by the severity of the injury nor by any local symptoms but the vicinity of the injury is exceedingly sensitive.

Fruend describes the three different stages of alteration which may be observed in the muscles due to gas gangrene. In every case it is observed that the peripheral part of the injured muscle is more involved than the proximal part.

In the lighter forms, incisions in the fascia, widening of the wound, and oxygen insufflation suffice to effect recovery but in the subfascial forms even deep and wide multiple incisions will often not suffice and in 8 cases so treated by the author he was obliged to amputate the limb in 6 with deaths. Kuemmel's statistics of mortality was 3 per cent and Franz's 53 per cent in subfascial cases.

In the treatment of the subfascial form early diagnosis is important. Free opening up of the parts and excision of the diseased parts of the muscle is the best procedure. Sometimes it may be necessary to remove a whole group of muscles.

Amputation must be resorted to when in spite of the energetic action the necrotic conditions are seen to spread in the muscles or the muscles of the proximal joint are involved. W. A. BREIDEN

Pollicard, A. and Desplas, B. *Researches on the Secondary Suture of War Wounds (Recherches sur la suture secondaire des plaies de guerre)* *Lyon chir.* 9 6 411, 43

This article which is the result of the collaboration of biologist and surgeon is said to be only a preliminary study. The authors give the details of four observations, describe their technique, and discuss the physiology of wounds with regard to secondary suture. They think that there is an essential difference between secondary reunion in wounds and reunion by first intention in the case of operative wounds.

In the latter the phenomena are exclusively those of conjunctive regeneration. But war wounds are always infected, even if only slightly so, and to the tissue repairment must be added the defense against infection. The coexistence of an inflammatory reaction with conjunctive repairment gives special phase to such injuries.

Study of such war wound between two points of suture shows that there is multiplication of germs while scarcely one may be found in the exudate before suture after 12, 30 or even 80

germs may be found, including streptococci bacillus pyocyanus, etc. This multiplication begins immediately after suture and lasts three to five days. From the fourth to the seventh day germs are no longer found.

At the same time there coexists a notable leucocytary reaction. There is an afflux of neutrophile polymorphs. When the inflammatory reaction is subsiding masses of leucocytes undergoing a clear transformation are always met with, and the presence of such when noted is always an excellent index of the satisfactory evolution of a sutured wound.

It is important to follow the evolution of a secondarily sutured wound by frequent microscopical examination of the serosity which flows between the two points of suture. The mode of a secondary suture is little known but it represents such a surgical and social advance that multiple researches by discovering and comparing the factors which constitute it will lead to its generalization.

W. A. BREIDEN

Perret, M. *Results Obtained from Employing Carrel's Method in War Surgery (Résultats obtenus par l'emploi de la méthode Carrel en chirurgie de guerre)* *Bull. Acad. de méd. Par.* 9 6 427, 434.

From August to December 1915, Perret treated 111 severely wounded cases in his ambulance service by the Carrel method. Of the series 78 were lesions of the soft parts, 33 were osseous lesions. There were no deaths. All the wounded have recovered and are in good condition. Not a single amputation was necessary. The method has eliminated infection according to the author.

The author states that all surgeons at the front are unanimous in declaring that the wounded treated by the Carrel method rapidly recover. As to whether Dakin's fluid is the only one capable of bringing about this result or not there is no longer any doubt and any delay in applying he considers grave fault.

W. A. BREIDEN

Uffoltz. *Secondary Union of War Wounds by First Intention in the Field Hospitals (La Réunion secondaire des plaies de guerre par première intention dans les formations sanitaires de 1^{er} vant)* *Bull. Acad. de méd. Par.* 9 6 437, 335.

The results obtained by Carrel and his confrères in the secondary reunion of non-sutured wounds were obtained under very favorable surgical conditions in a rear hospital but it was questioned whether these results would have been obtained in a field service hospital where such favorable conditions did not exist. The memoir now submitted is in answer to this criticism. This independent report of Uffoltz demonstrates that Carrel's abortive method of infection, if it may be so termed, is applicable at the front as well as at the rear.

Of 8 wounds in which the method was followed with success, 12 were shell or grenade wounds, which are generally infected, and 6 were caused by

rifle bullets but of such a nature that they might be classed as infected wounds. The rule has been followed in these cases of not suturing contused or infected wounds and allowing them to unite by secondary intention.

In his communication of October last Carrel discussed suturing. He preferred the employment of agglutinative strips to draw together the external as well as the deep edges of the wound. In large and deep wounds the strips are applied after having the deep edges approximated by some strengthening stitches. This procedure favors cicatrization from depth to surface. In the 18 cases now reported 10 were sutured but the suturing was late and after the freshening of the edges. In 6 cases adhesive strips alone were used and in 1 case of a large and deep wound shell of the arm reunion was effected by deep sutures on the ninth day. This was followed by the use of adhesive strips and cicatrization was complete by the forty-eighth day. Under the usual treatment the repair of such a wound would take from three to four months. The author believes that the Carrel method has abridged the treatment of war wounds by one half or two-thirds.

The technique followed in these cases is that of Carrel, but Pozzi is not quite sure that the modified form of Dakin's solution has been used. Carrel has intimated that he now uses Dakin's solution prepared as follows:

For 10 liters	
Chloride of chalk	200 grams
Carbonate of soda, dry	100 grams
Bicarbonate of soda	80 grams

The ingredients are mixed cold with 5 liters of ordinary water triturated, etc. No heat is employed.

W. A. BRENNAN

Enderlen, Experiences of a Consulting Surgeon
(Erfahrungen eines beratenden Chirurgen) *Beitr. z. klin. Chir.* 1916, cviii, 419

Enderlen gives his experiences of German war surgery from his diary notes. In the early part of the war the conservative treatment of wounds was found to be unsuccessful and after October 1914, active treatment was instituted in lieu of it.

Gas phlegmons, or gas burns as they are called by Fraenkel, were seen not only in the superficial but in the deeper tissues and seemed to result from all kinds of wounds. In the lighter epifascial phlegmons incisions and bandages soaked with H_2O_2 , or acetic acid and oxygen insufflation generally sufficed but in the more serious cases and deep involvement amputations of limbs was necessary.

During 1914 Enderlen lost 27 out of 34 cases of tetanus, although all the usual means were used. The scarcity of tetanus at the present time is due to prophylactic vaccination.

Cranial wounds since October 1914 have been re-examined and active measures instituted. Drainage and suturing have given good results. In the case of chest wounds the thorax was closed when possible. In larger defects of the chest wall the

lungs were sutured in to prevent mediastinum depression. Autopsy in two cases showed completely collapsed lungs and empyema. Hence it is best before closing the chest cavity to inflate the lung by ample pressure.

Enderlen operated from the beginning in intestinal gunshot wounds and had 67 successful cases out of 154. After ten hours if not operated the chances of success are slight. Liver and kidney injuries are better adapted for conservative treatment. Intraperitoneal bladder injuries are mostly fatal. Extraperitoneal bladder injuries can usually be managed with continuous catheterization. Urethrotomy is generally called for in urethral injuries.

In spinal region injuries the outlook is not entirely hopeless. Treatment should be instituted even though the prognosis is gloomy. In the lumbar spine the results give even better promise. Enderlen mentions a few cases of sectioned nerves which were sutured with good anatomic result.

For vascular injuries Enderlen has used ligatures, suturing and transplantation. The ligature is generally confined to the smaller vessels but suture will be used in the femoralis popliteal carotids and other large vessels as in these cases the ligature of the vessel is liable to cause gangrene in the limb. In the brachial and femoralis Enderlen both sutured and transplanted with good results.

W. A. BRENNAN

Pottle, J. and P.: The Advanced Surgical Post (Le poste chirurgical avancé) *Rev. de chir.* 1916, xxv, 302

The authors believe the establishment of advanced surgical posts in the battle line is necessary. In such a post properly constructed and protected the surgeon can operate safely and calmly. Such operations are not only acceptable, but are demanded by the wounded. The utility of such posts as regards hemorrhagic injuries is unquestionable.

In other conditions such as abdominal wounds early intervention is the essential condition for success. For such the advanced post is necessary. Amputations must yield to early resections. Infection is next to hemorrhage the cause of numerous amputations which can be avoided by care and attention in the advanced post. Where wounded cannot be despatched every day to clearing hospitals the advanced surgical post is indispensable.

Details are given of 84 operations carried out in such a post also of the necessary accommodations, construction and equipment.

W. A. BRENNAN

HOSPITAL, MEDICOLEGAL, AND MEDICAL EDUCATION

Burden of Proof in Actions for Negligence. (*Viola et al. vs. H. Winslow* (N.J.) 95 Atl. R. 905) *J. Am. M. Ass.* 916, lxvi, 737

In the case of *Nubel vs. Winslow* the New Jersey Court of Appeals discussed the propriety of the following instruction which the trial court gave to the

GYNECOLOGY

UTERUS

Clark, S. M. D. Discussion of Cancer of the Cervix Uteri with Especial Reference to the Combination Method of Treatment. *T. St. J. Med.* 9 6, 25, 3

For convenience of discussion, cervical carcinomata are divided into four groups as follows:

1. In the first group are found the incipient cases. The ulceration is strictly limited to the cervix and there is no evidence of lateral infiltration. The uterus is freely movable. Menstruation is slightly prolonged with an occasional irregular show. There is an irritating vaginal discharge. The patient is constitutionally unimpaired and a good surgical risk. Cases falling in this group are treated by combining at the one sitting the application of the heat and the radical removal. The Wertheim removal is undertaken.

In fat women, the Percy cautery alone gives these early cases their best chance of cure since the technical difficulty of carrying out the radical plan is too great and further the high primary mortality would discount its feasibility.

It is most deplorable that more cases do not fall under this first group. Once there is thorough co-operation of an alert profession with an educated public the percentage of early cases will increase.

2. In the second group the cervix is well infiltrated with carcinoma, with a slight extension to the vaginal wall. Though as yet there is no pain in the sides, still a definite thickening and slight involvement of the parametrium can be palpated. The uterus is still movable with irregular flowing and at times, profuse loss of blood. There is secondary anemia and the patient is constitutionally below par. Many of these cases succumb from the operation since they are poor surgical risks. These cases must be transformed constitutionally before being subjected to the major operation. It is here that the Percy cautery in combination with ligation of both the internal iliac and ovarian arteries, as two-at-one sitting, so excellently serves the desired ends.

After the preliminary sitting, these patients are kept in bed for ten days when they are allowed to be up and are placed on forced feeding and Bland pills. From three to five weeks there will be noted a marked change both locally and constitutionally. With the cessation of the hemorrhage as well as the toxemia, the hemoglobin will have risen from 5 to 30 per cent, the vessels are full, the entire economy has improved and from having been a doubtful surgical risk, the case is now in frankly operable state. Radiotherapy is in its swaddling clothes. It is now in its experimental stage and it is

too early to come to conclusions. The only attitude to be taken is that of receptive state of mind.

3. In the third group the cervix is markedly infiltrated with carcinoma having extended at least an inch into the vaginal wall. Usually there is a large crater-like cauliflower mass bulging into the vaginal canal. There is marked impairment of mobility with noted lateral infiltration from the lower segment of the uterus. Pain in one or both sides is experienced. Pronounced cachexia and anemia are present. Constitutionally and locally they are inoperable. Heretofore these cases have been treated from the utterly hopeless standpoint.

The combinative method of treatment can be adopted to advantage in this group. While in the abdomen for ligature a thorough prospectus of the extension of the disease can be gained and the lymphatics removed as guide to the possibility of future surgical procedure. It is in this stage of the disease that we are put in the repeated use of the cautery to injure the bladder or possibly the rectum. In some of these cases the local and constitutional condition will have so decidedly improved after the cautery and ligation that judging from the mobility of the uterus, it will be thought possible to do a complete operation for after the upper two-thirds of the uterus is freed and the ureters detached from the focus, one usually finds that the upper two-thirds of the uterus part from the lower infiltrated segment.

4. The fourth group comprises the absolutely hopeless class of cases. The rectum, bladder and vagina are in one conglomerate, infiltrated mass. There is frequent and at times, copious flowing with foul vaginal discharge, advanced cachexia, wrecked constitution besides, the patients are usually addicted to taking large doses of morphine. More damage than good follows any attempt at local treatment in these cases. Deep X-ray exposure or massive doses of radium will give some relief from pain, but the cases are hopeless.

EDWARD L. CORNELL.

Tennant, C. E. The Use of Heat in the Control of Inoperable Cancer. *Cal. Med.* 9 6, 25, 76

Modern investigations seem to prove conclusively that heat is one of the most effective therapeutic means we have in the control of cancer provided it is properly applied. The subsequent use of the X-ray with cross-fire applications of the rays from hard tube is, no doubt, good after-treatment. The source of the heat may be varied from hot water to the actual cautery but it must be constant, long-continued and free from insulation, in order to spread evenly a temperature of 120 to 150° F. throughout the mass.

In applying the treatment to carcinoma of the pelvis or other easily accessible structures the Percy cautery irons are probably most satisfactory. The use of heat with the Percy irons, as a method of treatment is proving very satisfactory in inoperable cancers of the lip, face, neck, and breast. This should be followed later by radical excision thereby doing away with the possibility of metastatic recurrence.

The experiments which the author has made on large masses of beef lead him to believe that in the d'Arsonval current we also have a very potent and serviceable means of obtaining the same or even better results in tumor masses located in some of the more inaccessible portions of the body. This conclusion is based upon the fact that in every test made the d'Arsonval current raised the average temperature of a given mass 24° F. higher than the cautery irons did in just one half the time consumed by the latter.

EDWARD L. CORNELL.

Chiaje, S. delle: Red Myoma of the Uterus (Míloma rosso del útero). *Ann. di ostet. e ginec.* 1916 xxxviii 197.

The so-called red myoma of the uterus was first described in 1905 by Polioson and Violet who reported a few cases. The tumor is so-called on account of the characteristic red color like raw flesh in appearance which it presents in section. Since 1905 a few other cases have been described.

The author gives a summary of all cases found in the literature and describes a case of his own. In discussing these tumors the author considers that from the anatomopathologic standpoint they are usually situated on the anterior wall of the uterus and are constantly interstitial. They are almost always homogeneous and when exceptionally distinct nodules occur they never have the same structure but are fibrous in character. The tumors are covered with a fibrous capsule and in section show the characteristic coloring. The anatomopathologic features which confer a certain special physiognomy on these tumors are: (1) intense vascular hyperplasia, (2) interstitial hemorrhagic foci more or less diffuse (3) embryonic character of the muscular elements. Clinically the tumors are observed to increase rapidly and gave rise to pain and fever.

The brusque manifestations the manner in which they occur and the periodicity which they assume, give a certain clinical picture which has a diagnostic value. In the interpretation of these phenomena congestion is an element of the greatest importance. The morbid conditions with which red tumor of the uterus may be confounded are benign or sarcomatous fibromata in course of degeneration. A careful examination of the characters of the phenomena will permit of a differential diagnosis but it is more difficult to distinguish the tumor from an ovarian cyst with torsion of its pedicle.

In the case reported by Chiaje the patient showed the local and general clinical features of a pelvic tumor and the case was diagnosed as an ovarian

cyst with twisted pedicle. This diagnosis however was altered on opening the abdomen when it was seen that the tumor was developed on the anterior uterine wall and a hysterectomy was done. Examination of the tumor showed the anatomic characteristics of a red myoma. W. A. BRENNAN.

Deluca F. A.: A Case of Unilateral Polypiform Oedematous Elongation of the Uterine Cervix (A proposito de un caso de elongacion oedematosa cervical polipiforme unilateral). *Rev. de la Asoc. Méd. Argent.* 1916 xxiv 611.

A case of this very rare complication of labor is reported by the author in a woman of 28 a II para, who twelve hours after the onset of labor showed a fleshy tumor in the vulva, the size of a hen's egg which though reduced reappeared as the pains became frequent and intense. The woman was removed to the hospital. The tumor was then the size of an orange soft and pasty wine red in color and situated on the anterior cervical labium. One hour later the labor terminated spontaneously. After the birth the tumor gradually diminished in size and disappeared about two months later.

The author's research shows that this complication originates usually during labor and that its situation is by choice on the anterior labium. Several factors contribute to its causation. It is characterized by a distention and prolapse of the anterior wall of the inferior segment, elongation of the supravaginal portion of the uterine neck and oedematous tumoration of its intravaginal part, the dilatation of the neck being at the expense of the posterior cervical labium.

Deluca thinks that the condition should more correctly be termed cervicosegmentarial or 14th micocervical unilateral polypiformoedematous elongation (of Rouver).

It always occurs with a cephalic presentation and nearly always in multiparae. Spontaneous birth is always possible. The causes may be predisposing or determining. In the first group are comprised the anatomic constitution of the inferior segment, multiparity, narrow pelvis, prolapse and uterine anteversion, exaggerated softening of the inferior segment posterior presentation etc. in the second group energetic uterine contractions early presentation, and premature expulsive force.

W. A. BRENNAN.

Wallace, C. H.: Essential Hemorrhage of the Uterus. *J. Mo. St. M. Ass.* 1916. xiii, 20.

According to Wallace, essential hemorrhage must be diagnosed by elimination from the following:

- 1 Hemorrhage from retained secundines.
- 2 Hemorrhage from placenta previa.
- 3 Hemorrhage from fibroid tumors of the uterus.
- 4 Hemorrhage from endometritis.
- 5 Hemorrhage from chronic oophoritis or cystic ovary.
- 6 Hemorrhage from tubo-ovarian cyst.

7. Hemorrhage from deciduoma malignum and uterine cancer.

8. Hemorrhage due to senile vascular changes and hemophilia.

Once the diagnosis is made certain the author believes that hysterectomy or oblation of the uterine cavity by atmocautic is the only treatment.

HARVEY B. MATTHEWS

Fitzgibbon, G. The Etiology of Uterine Prolapse and Cystocele. *Surg. Gynec. & Obst.* 96 p. 33.

The author considers that some operation should be devised as the all around basis for the surgical treatment of these conditions. All evidence points to the fact that prolapse of the uterus is not the result of some damage done during parturition. The probability is that it is the same structure which is damaged in nearly all the cases. In nulliparous women the defect is probably the same, but here the fault is congenital and requires.

Lacerations of the peritoneum no matter how extensive have no effect upon the elevation of the uterus, and such lacerations could not possibly involve that part of the levator ani muscle which supports the cervix uteri. The structure which is considered the main support of the pelvic organs is the visceral or endopelvic layer of pelvic fascia. This is very fully described and shown to form complete pelvic diaphragm broken by the passage through of the viscera and parts attached to them. This together with the levator ani muscles forms the pelvic diaphragm, the fascia taking up the constant strain and the muscle acting by re-enforcing the fascia against pressure.

In descriptions of the fascia the upper or true supporting part of the fascia is quite neglected and the thin part which follows the levator ani muscles as their inner sheath is shown as if it were the whole of the rectovaginal fascia whereas it is very unimportant part. The vagina is shown by diagrams to lie obliquely below the fascia, the fornices only slightly go above the plane of the fascia while the uterus is chiefly above having its greatest attachments in front of the plane of the broad ligaments. The bladder is wholly above the fascia which separates it from the anterior vaginal wall. Prolapse of the uterus is the result of rupture of the fascial sling across the pelvis attached to the sides of the cervix and the lateral vaginal fornices. When this is damaged prolapse of the uterus alone takes place, the vaginal fornices being gradually inverted but the bladder being retained well up. When the fascia in front of the cervix and the anterior vaginal wall is ruptured cystocele develops, but the cervix is fully maintained. These two conditions may be combined and the whole pelvic contents comes down.

The failure of the present-day operations is the result of efforts to cure prolapse of the uterus by an operation only suitable for the cure of cystocele and the failure to recognize that interposition is useless unless the cervix is maintained well up. This is effected in a certain number of cases by the practice

of doing a high amputation of the cervix and covering over the stump with the vaginal wall, in doing so a certain amount of fascia is caught in and those cases in which a sufficient amount of fascia is caught result in cures while the others elapse but the need of catching in the fascia is not recognized. The pelvic viscera can be fully supported by an operation to unite the broken fascia in front of the cervix and below the bladder and this can be done without removal of organs or such distortion as will render childbearing in any way hazardous and can therefore be adopted in the young parous woman without sterilization.

Pascal, A. Treatment of Uterine Prolapse (Treatement du prolapsus uterini). *Presse med.* 96 p. 33.

For simple retroversion where there is no adnexal lesion Pascal believes that Alexander's operation under local anesthesia will suffice. If adnexal inflammation is suspected a laparotomy should be done and the procedure of Döderlein followed, which consists in fixation of the two round ligaments in a buttonhole made in the two large right muscles. If the ligaments are weak an abdominal hysterectomy may be necessitated.

For prolapse with predominance of cystocele in women of 40 Pascal recommends vesicovaginal interposition limited to women between 35 and 45 years.

For prolapse with atrophied uterus, flaccid vaginal walls, and gaping vulva the author is of the opinion that the Kocher operation does not give sufficient guarantee to assure the fusion of the uterus with the anterior abdominal wall and he therefore uses the Murphy operation, following the Mayo technique.

In the case of women with atrophied uterus and relaxed walls gaping vulva, and permanent cystocele the author uses vaginal hysterectomy completed by median suture of the two large ligaments and perineal reconstitution. In old hysterectomized subjects where the ligamental stump was not sutured to the uterine or vaginal stump it is necessary to excise the vagina, or in case of a younger patient to make laparotomy and fix the vaginal or cervical stump to the abdominal wall.

Whenever an operation for prolapse has been carried out the surgeon must remember that the muscular tissues are insufficient semi-atrophied, and that such operations leave behind a tissue of fragile cicatrices. If the technique is good, surgical recovery is the rule but it is highly necessary to strengthen the recovery by a regeneration of the muscles. This can be effected by general hygiene and Brandt gymnastics which restore tonus to the atrophied muscles.

W. A. BRECKEN

McCann, F. J. The Treatment of Backward Displacements of the Uterus. *Med. Press & Circ.* 96 cl. 410.

McCann has written a very lengthy paper upon the old but very important subject of backward

displacement of the uterus and the methods generally employed for its correction.

Treatment as the author states, has very markedly improved in recent years owing largely to the advances made in gynecological surgery and to a better understanding of the causation and sequelae of this condition.

The subject is outlined as follows

- 1 Congenital uterine displacement
- 2 Retrodisplacement due to excessive mobility
- 3 Traumatic uterine backward displacement
- 4 Treatment of backward displacement in virgins.

5 Treatment of backward displacement in multiparae (a) method of replacing the uterus, (b) treatment by pessary, (c) treatment of backward displacement when pain and tenderness exist (d) treatment of fixed backward displacement

6 Treatment of backward displacement in parous women (a) when the uterus is replaceable (b) when it is fixed.

7 Operations for the correction of backward displacement (a) abdominal (b) vaginal.

8 Backward displacement after the menopause.

9 Backward displacement in association with uterine and ovarian tumors.

10 Backward displacement of the gravid uterus.

Treatment may consist in (1) spontaneous replacement (2) bimanual replacement (3) operative replacement.

The author has given under each of these headings a general plan of procedure calling particular attention to those methods most successful in his hands. Some of his methods are original the majority however are those of other gynecologic surgeons modified or not HARVEY B. MATTHEWS.

Taylor J. C. Vaginal Hysterectomy V I M J 1916 cl 53

After a brief historical sketch regarding vaginal hysterectomy, the author elaborates upon the present-day indications for the operation and describes his method of performing it.

The indications for vaginal hysterectomy as given by the author may be tabulated as follows

1 All cases in which conservation of the uterus is not to be considered except where tumefaction renders the uterus too large to be delivered per vagina or where extensive adhesions render impossible the proper approach to the uterus.

2 In intraligamentous and retroperitoneal growths

3 In women past the menopause who for any reason require hysterectomy except in those cases where the size of the uterus prohibits its delivery through the vagina.

4 In complete prolapse of the uterus after the menopause

5 In cancer of the cervix where the disease is too far advanced for a Wertheim operation yet it is deemed advisable to remove the uterus for the relief of pain and foul discharges. Such cases

may however be radiumized and later a Wertheim operation performed.

6 In cancer of the fundus where the growth is still localized.

7 In epithelioma of the cervix occurring in old women who have serious heart or kidney trouble.

The vaginal route should never be chosen where there is any involvement of the appendix or in testicles which might need attention or in complete prolapse occurring in young women.

The author's method of performing vaginal hysterectomy consists in the usual anterior and posterior separation from below upward after which the uterus is bisected the adnexa inspected adhesions if present are freed, and then each half of the uterus is removed by clamping from above downward. The space between the clamps is properly packed with iodoform gauze and a self retaining catheter is left in the bladder. The clamps are removed in forty-eight hours. The gauze packing is removed on the sixth or seventh day and lighter packing replaced until healing is completed.

This technique is modified in the presence of fibroids or complete prolapse. Where fibroids increase the size of the tumor very materially V-shaped pieces may be continuously cut away until the top of the fundus is reached when division of the remaining tumor may be accomplished. In case of complete prolapse the ovarian and uterine vessels are ligated the clamps removed and the base of each broad ligament is sutured into the vault of the vagina which is sufficient to hold the vaginal vault high and keep the bladder in normal position.

In conclusion the author states that in a series of over 300 vaginal hysterectomies there has not been a single death traceable to the operation itself and therefore he highly recommends this operation in all suitable cases HARVEY B. MATTHEWS.

Truecaldle P. E. Vaginal Hysterectomy for Prolapsed Uteri with a Report of Fifty Cases. Boston M & S J 1916 clxxv 13

The author employing a special technique has performed 50 vaginal hysterectomies for the cure of prolapsed uteri. The procedure as recommended is limited to the class of cases in which conservation of the uterus may be disregarded. The author's cases averaged 50 years of age.

The technique employed differs from the usual vaginal hysterectomy in that the author instead of making the incision through the broad ligaments in the usual manner extends the line of incision inward far enough to include a considerable portion of uterine muscle. By bringing together the broad ligaments with their appended portion of uterine muscle there is formed a central body for the resistance of intra abdominal pressure and firm support for the bladder.

This method, as the author says, is the same as the Watkins-Wertheim procedure, except that the greater part of the uterus and all the cervix are removed before the interposing act is accomplished.

extensive adhesions this procedure is of great value and is more applicable than the bi-lingual incision.

The advantages of the method are ease of exposure of round ligaments, rapidity of operation, single incision later hidden for most part by the pubic hair, the pull is in a forward rather than a lateral direction and permits of the application of a Pfannenstiel or Peterson procedure.

Claims for originality are: (1) All other operators employing the transverse suprapubic incision do so with a predetermined intention of opening the abdomen either in the midline or by the Pfannenstiel method which the author only exceptionally resorts to; (2) simple fixation of round ligaments in the midline to the abdominal fascia instead of to Ioupart's ligament or the inguinal fascial wound and certain features in connection with the technique.

Stanton, E. M.: End Results in Cases Operated for Salpingitis. *Am J Obst. N Y* 9 6 lxviii 1958.

The author bases his report on a careful study of the end results of 100 cases he has operated upon for pelvic peritonitis of tubal origin, and a study of the literature on this subject. Among 93 patients not subjected to hysterectomy there were several who for a time complained of leucorrhœa but gradually the uterine infection subsided and today he thinks each of these women is better off with her organs intact than she would otherwise have been. His experience confirmed by carefully checking the late results following operation has led him to believe that the operator should remove as little as possible and trust much to nature. C. H. Davis

MISCELLANEOUS

Heineberg, A.: The Causes and Treatment of Sterility in Women. *Therap Gaz.*, 19 6 xl, 463

Various types of sterility are recognized: (1) primary (2) relative and (3) secondary.

Primary sterility is that type in which the possibility of conception is precluded because of permanent congenital or developmental defects in the structure or function of the genital organs.

Relative sterility is a state in which the absence of conception is attributable to causes which are susceptible of correction. These causes may be structural, chemical, functional or emotional.

Secondary sterility, or what is commonly known as one-child sterility, occurs in those women who fail to conceive after the birth of one child.

The successful treatment of sterility in the female depends largely upon the recognition of its causative factors. Any case that seeks relief requires to be studied with infinite care in order to determine the cause or combination of causes which may be operative. Cognizance of the many complicated and baffling causes of sterility should cause one to hesitate to undertake its correction with the same non-chalance which has characterized most previous efforts in that direction.

The lessons to be learned from a review of this subject would seem to be:

1 Sterility in the female may be due to many causes, some apparent and easily determined, others obscure and discovered only after careful investigation.

2 Surgical treatment for its correction should not be instituted until an honest and thorough investigation has shown that the sterility may reasonably be attributed to structural changes in the female generative organs.

3 No investigation can be considered complete which does not in some way include examination of the semen. EDWARD L. CORNELL.

Stauffer, W. H.: The Relation of the Rectum to the Female Pelvic Organs. *J Mo St M Ass* 1916 xiii, 325.

The author draws attention to the anatomical relationship existing between the female pelvic organs and the lower bowel.

Diseases of the vagina, rectum or urethra and adjacent glands may have a common beginning and the etiology of the existing trouble be entirely overlooked because of the failure to make a thorough and complete examination of adjacent organs. As examples of such mistakes, gonorrhœa and syphilis may exist in one or all of these organs, i. e., vagina, urethra, or rectum, and if not properly diagnosed and treated in each organ, failure to relieve the patient will be the ultimate result.

In conclusion, the author urges a closer relationship between the work of gynecologist, urologist, and proctologist in order to insure the correct diagnosis and therefore the proper treatment in each given case. HARVEY B. MATTHEWS.

OBSTETRICS

PREGNANCY AND ITS COMPLICATIONS

Williamson, H. *Pregnancy Toxemia: a Study of Acidosis in Pregnancy*. (in *Med.*)

To determine the presence of alkalosis, four tests were employed: (1) the estimation of the alkalinity or rather the acid neutralizing property of the blood serum; (2) the estimation of the proportion of nitroge excreted in the urine; (3) the formation of ammonium salt; (4) the demonstration of acetone and diacetic acid in the urine. As the determination of the amount of sodium bicarbonate (administered by the mouth) necessary to render the urine alkaline.

1. The alkalinity of the blood was determined by a modification of the method described by Albroth Wright. In normal pregnancy the blood is found to be slightly alkaline; in toxemia the alkalinity of the blood is increased. In pregnancy the amount of sodium bicarbonate found to be necessary to render the urine alkaline is found to be much less than in normal pregnancy.

2. The total nitrogen estimated by Kjeldahl's method in the blood was found to be normal in all cases of toxemia. The ammonia content was high, the urea content normal, and the quantity of undetermined nitrogen in the serum of the nephritis there was not much higher than in normal conditions.

3. Acetone and diacetic acid were found in all cases of marked toxemia of pregnancy, and in no cases of normal pregnancy. In cases of chronic nephritis no acetone was shown, and no diacetic acid, but 5 cases had an acetoneuria which was the result of supervening toxemia of pregnancy.

4. The amount of sodium bicarbonate necessary to render the urine alkaline, as found to be high in the toxemia.

The conclusions drawn by the author are as follows: From the evidence before us we are justified in concluding that condition of acidosis is usually associated with pregnancy toxemia. In the milder and slighter cases the tests applied failed to demonstrate the presence of an acidosis, and in a severe case of eclampsia recently under my care a similar negative result was obtained.

This case has convinced me that further investigations are required and that certain conditions with which yet we are very imperfectly acquainted must be ascertained before we can definitely establish the relation existing between pregnancy toxemia and acidosis.

I do not believe that the symptoms of toxemia are due to the acidosis, but that the acidosis is a result of the toxemia. I believe that the acidosis is a result of the toxemia, and that the toxemia is a result of the acidosis. I believe that the acidosis is a result of the toxemia, and that the toxemia is a result of the acidosis. I believe that the acidosis is a result of the toxemia, and that the toxemia is a result of the acidosis.

I regard it as probable that those who believe that chloroform should be used in the treatment of cases of pregnancy toxemia, should also use the chloroform. I believe that the chloroform should be used in the treatment of cases of pregnancy toxemia, and that the toxemia is a result of the chloroform.

Boero, A. *Lat. Conservativa Caesarian Operation with a Vert. Presentation for Obstetrical Atrial of the Vagina*. (in *Med.*)

It was seen in a woman of 25 years of age, who had been married for 10 years, and who had 4 children. The first child was born at term, and the second child was born at term. The third child was born at term, and the fourth child was born at term. The fifth child was born at term, and the sixth child was born at term. The seventh child was born at term, and the eighth child was born at term. The ninth child was born at term, and the tenth child was born at term.

All reported cases of cicatricial atresia in which operative intervention has been made, have a mortality of 43 per cent. In 130 cases, conservative cases are reported. In 24 cases under similar conditions, has given a mortality of 41 per cent.

If the aliter of the vagina is very narrow, if the uterine neck has not been placed already for atresia or for any other cause, the post-caesarian foetal retention is a grave consequence which will be as in cases where an amniotic infection exists. Imposes a subtotal hysterectomy or a total operation. If on the contrary the clear state of the vagina and the uterine neck permits the hope of a good drainage in a conservative caesarian, if the

conditions which are necessary exist it should be given the preference. These conditions existed in the case reported.

W A BRECKMAN

Harrar J A. Post Mortem Cesarean Section; a Report of Ten Cases. 4th J Obst N Y 1916 lxxiii, 1046

The author gives a brief review of the literature on this interesting subject and a brief history of ten cases from the New York Lying-In Hospital.

In the series reported three babies were stillborn. It is probable that the death of all these children occurred before the death of the mother. Four babies were born with hearts feebly beating but there was no attempt at respiration during prolonged efforts at resuscitation. One baby gave a few feeble gasps and died shortly after delivery. One baby slightly asphyxiated at birth died on the sixth day of pneumonia. One baby badly asphyxiated at birth left the hospital living and well and one crying spontaneously at delivery was also discharged living and well.

C H DAVIS.

Sonnenburg, C. N. Cesarean Section Performed with a Pocket Knife After Death of Mother Resulting in Normal and Living Child. *In diaspora* 3 M J 1916 xiv 340.

The patient had had two uneventful previous pregnancies and no miscarriages. She had marked arteriosclerosis with blood pressure varying during her pregnancy from 180 to 210. The urine contained no albumin or casts. Two days before entering the hospital there was edema of the lower extremities which continued. There was evidence of congestion of both lungs. Endocarditis, myocarditis, and acute dilatation were observed. One morning she had a pulmonary hemorrhage and before the author could reach her she died.

So much time had elapsed in the effort to restore the patient that Sonnenburg feared to wait for the instruments and so performed a cesarean section with a pearl handled knife, 5.5 inches in length with a 2.5-inch blade. The baby girl was resuscitated in four minutes and has been gaining in weight rapidly. It was a full term infant weighed seven and one-half pounds, and was normal in all respects.

EDWARD L. CONNELL.

Waegeli, C. Interstitial Pregnancy (La grossesse interstitielle). *Rev de gynéc. et de chi* abd 1916 xlii, 405 441

Interstitial pregnancy is rare and Waegeli in a very extensive research of the literature on the subject has been able to collect only 150 cases, and of these many are very doubtful as both the macroscopic and microscopic descriptions are either lacking or incomplete. On this account Waegeli rejects 38 cases. Of the remaining 112 cases, many do not on examination satisfy the elementary postulates concerning which most authors are agreed and such cases if admitted must be taken on faith rather than on the evidence submitted by them.

The interpretation of an interstitial pregnancy is always difficult. It can easily be confounded with an angular pregnancy, with that in a rudimentary uterine cornua, or with a tubal isthmic pregnancy. From these considerations and from lack of satisfactory internal evidence Waegeli reduces the number of cases of genuine interstitial pregnancy reported in the literature to 53.

He describes with great detail and exactness the macro- and microscopical features of two cases which came under his observation in the Gynecological Clinic of the University of Geneva. In both cases the macroscopical and microscopical findings demonstrated clearly the development of a left interstitial pregnancy.

In the first case, the uterine fundus was strongly inclined (sign of Ruge Simon) the left round ligament laterally inserted and there was asymmetry of the insertion of the adnexa the left being much higher than the right. The fetal cavity is clearly separated from the uterine cavity the hernia of the uterine caducons into the fetal sac showed that this caducons did not continue any part directly with an analogous formation in the ovular cavity. Sections from the tube show that there is no sign of an ovular graft. The greater part of its interstitial portions has no connection whatever with the ovular sac. All the evidence is in favor of a clear intramuscular or intramural insertion of the ovule and not intratubal or intracanicular. The fetal sac is developed in the muscular tissue itself. Neither does the microscopic examination show the least sign whatever of any inflammatory process in either tube.

In the second case the macroscopic and microscopical findings, which were almost identical in character also establish the development of a left interstitial pregnancy. A muscular septum several millimeters thick separated the uterine and fetal cavities. Sections of the left tube in the vicinity of the fetal sac show the complete absence of ovular graft. The uterine fundus is quite vertical and the left adnexa are almost 5 cm. higher than the right. It is quite clear in this case also that the ovule is inserted in the muscular wall surrounding the tube but not in the tubal canal itself and the wall of the fetal sac shows clearly that it is constituted entirely of muscular tissue.

From a further study of the cases Waegeli thinks that the irruptions of the chorial villousities and their epithelium into the wall of the fetal sac does not occur during the early period of pregnancy and not until it is two or three months advanced.

In the second part of his extensive study Waegeli from a consideration of his own cases and the details furnished by others, endeavors to build up a complete clinical picture of interstitial pregnancy. After full consideration of the various classifications of other authors he finally classifies this affection in the following manner:

1. Interstitial pregnancy intramural or paramural (a) with evolution against the uterine

seron, (b) with evolution against the uterine cavity (c) with evolution in the two above-stated directions.

3. Canalicular interstitial pregnancy. This classification will, according to Waegell, include every reported case.

Waegell thinks that the etiology of interstitial pregnancy is the most obscure chapter in the history of the affection. Having considered the various etiological theories submitted he declines to express any opinion in favor of one or the other. The truth is probably that different anomalies of the uterus and adnexa concur to facilitate the interstitial insertion of the ovule. Today we are scarcely more advanced than Velpeau, who in 1837 wrote that the mechanism of interstitial pregnancy was still totally unknown.

The symptoms and signs of an interstitial pregnancy are rarely distinguishable before operation or removal. The pregnancy most frequently ends by rupture, thus occurring in the majority of recorded cases from the second to the fourth month, although it may extend to the seventh month. But in rare cases the resolution of the pregnancy may be by a uterine abortion of the complete ovule or by an incomplete uterine abortion. The latter has occurred in four of the recorded cases. However, the pathological anatomy is characteristic. Macroscopically there is a round tumor in the corresponding uterine cornua. This tumor contains the fetal sac inserted in the parietal musculature. A direct consequence of its development is the separation of the insertions of the round ligament from the ovarian and tubal ligaments. A muscular wall formed between the uterine muscular septum was found to exist in 5 of the cases recorded. The absence of such a septum implies canalicula interstitial pregnancy with uterine evolution.

But perhaps the most characteristic sign is the extraordinary position assumed by the uterine fundus. This becomes more and more inclined until it is almost if not quite vertical. Some, however, dispute the pathognomonic value of this sign. In the cases collected by Waegell the sign was present in 33; it was not present in 5 and its presence was not indicated in 15. It was present in both the author's personal cases. While this sign is present in the majority of cases its absence can not be held to be a criterion of disqualification.

Waegell discusses the other macroscopic concomitants of interstitial pregnancy: the insertion of the round ligament in laterality of the fetal sac; modification of position of the adnexa. Interstitial pregnancy is accompanied by a characteristic asymmetry of the tubes that on the gravid side is in the immense majority of cases being higher than the other.

In the microscopic anatomy the question which dominates all others is that of the formation of caducous in the fetal interstitial cavity. Opinions on this are well divided and Waegell discusses the various arguments without arriving at any very definite conclusions.

The clinical diagnosis, prognosis, and treatment are finally discussed. In the statistics it is shown that in 9 cases where intervention was made before rupture all recovered. Twenty-nine which were operated upon after rupture gave a mortality of 75 per cent. The operation of choice is the excision of the gravid uterine cornua and the corresponding tube. Total hysterectomy is indicated only if there is infection. The rule adopted by the author is to immediately operate upon every case of interstitial pregnancy when such a diagnosis is made; moreover it is absolutely necessary to intervene even in cases where an interstitial pregnancy is only suspected. The dangers of an immediate laparotomy are less serious than those occurring from a delay which may at any moment result in a fatality.

W. A. DAWSON.

Fetal Blood Ferment in Pregnancy. *M. J. 96, xxx.*

The author believes the following conclusions express the attitude of most workers toward the Abderhalden test.

The Abderhalden test is not a specific and infallible test for the diagnosis of pregnancy cancer or any other condition.

A negative reaction in a given case is of great value as speaking against the possibility of pregnancy.

A positive reaction must be interpreted as only speaking for the diagnosis of pregnancy and that only in absence of a large number of pathologic conditions some of which attention has already been called.

The ferments are increased in the blood during pregnancy. As yet, however, no way has been devised for differentiating between these ferments and the ferments mobilized in many pathologic conditions.

The test should be done in all cases in which the diagnosis of pregnancy is in doubt with a full knowledge of its limitations and possible errors. It should be regarded as corroborative evidence together with other clinical phenomena.

D. J. L. BORO.

Kraus, H. A. Pregnancy Complicated by Syphilis. *M. J. 96, xxx, 2.*

If a woman has a genital chancre at the time of conception or shortly after it, course is often protracted and the ulcerations are deeper and more extensive than usual. Secondary lesions and subjective symptoms are often aggravated.

Syphilis is a frequent cause of abortion and premature delivery especially between the sixth and eighth months. In the majority of cases miscarriages are caused by the death of the fetus.

The effect of syphilis on the ovum varies. The child may be born healthy and remain so or it may develop signs of syphilis in three to six weeks, or it may show distinctive signs at birth. Other symptoms may appear which are the result of disease (hemorrhage, jaundice, etc.). The child may

show various congenital malformations, or it may die before birth, and characteristic lesions may or may not be shown in the placenta following abortion.

Early treatment must be instituted before the middle period of pregnancy. A mixed treatment of mercury and arsenic is advised. Children born without lesions and a negative Wassermann should be treated. The author uses a daily injection of some soluble salt of mercury increasing the amount to the point of salivation. A weekly intravenous injection of 0.1 grain of neosalvarsan is given with the mercury. D. H. Boro

Smead, L. F.: Gunshot Wounds of the Abdomen in Pregnant Women. *Tr Am Ass Obs & Gynec* Indianapolis, 1916 Sept.

The author reports the case of a pregnant woman shot through the abdomen both mother and child recovering. The bullet perforated the colon and the uterus of the mother the placenta, and the child's hand.

Gunshot wounds of the abdomen are more dangerous during pregnancy than at other times. The abdomen should be opened in all cases if possible. The uterus at full term should be emptied by cesarean section and at earlier periods if the organ is badly injured. A uterus during labor is likely to spread any infection which is free in the abdomen and a pregnant uterus is therefore a menace to the patient if peritonitis develops.

The uterus is usually emptied by cesarean section or hysterotomy because the abdomen is open.

Hysterectomy is usually not indicated in gunshot wounds of the abdomen unless the uterus is badly lacerated.

Drainage should always be used in these cases and irrigation very rarely.

About thirty cases of gunshot wounds of the abdomen in pregnant women are cited.

LABOR AND ITS COMPLICATIONS

Freeland, J. R.: Scopolamine-Morphine Anesthesia in Labor; a Report of Seven Years Experience. *Penn. M J* 1916 xix 768

The author uses Merck's scopolamine. He thinks it advisable to confine oneself to one preparation when contradictory results have been obtained by various investigators.

The author's method of administration is the one usually adopted except that he eliminates much of the mental suggestion that is associated with darkened rooms softly stepping attendants whispered orders, cotton in the patient's ears etc. In his opinion, too dark a room interferes with observation of the patient. A dimly lighted but not gloomy room, free from extraneous noises and interruptions, adds to the effectiveness of the drug but carried to the extreme and associated with the other elements of suggestion already mentioned creates an atmosphere potentially harmful to patients in the receptive mental state caused by scopolamine.

Therefore all movements, conversation and manipulations are carried out in a natural manner and not with the hushed mysterious air of moths at a funeral or assistants at a magician's entertainment.

Great capital has been made out of the popular belief that a specially equipped hospital is necessary for deriving the greatest benefit from scopolamine. This is of course a nonsensical contention. With a trained nurse capable of counting the fetal heart beat and conversant with the care of patients who have been anesthetized for any purpose, the average home offers the atmosphere of quiet that is claimed to be a necessity. In this one respect the best-equipped hospital in the world has no advantage over the quiet bedroom to which the patient is accustomed.

Regarding the effect on the child it has been claimed that a condition of apnea frequently follows the use of scopolamine. The author's results show this to be no more frequent than after any other anesthetic, and it is much more likely to be caused by morphine than by scopolamine. Resuscitation of asphyxiated infants was not required oftener in the scopolamine than in the other cases.

There were no children born alive who died because of failure of resuscitation, except one case of cerebral hemorrhage the diagnosis being confirmed by autopsy. The fetal mortality in 470 cases was 8 or 3 per cent excluding four children that were macerated. The causes of death in the stillborn infants were cerebral hemorrhage 2 cord around neck 1 cause unknown as no autopsy was allowed 3. Two died after delivery one from stenosis of the larynx and one from cerebral hemorrhage, both diagnoses being confirmed by autopsy.

As to the effect on the duration of labor in 236 primiparae the average duration of labor was twenty-two and one-sixth hours. These patients were of all ages.

There is one type of cases in which scopolamine does delay labor and increase the frequency of forceps application that is those patients in whom it produces delirium and uncontrollable restlessness.

One point should always be remembered in connection with the question of the duration of labor and that is that a sedative is most needed by patients in whom labor is prolonged and will most often be used in cases of this type to the detriment of the reputation of whatever sedative is used if unequalled statistics are presented. The patients who have short quiet labors require no anesthetic and so lower the average duration of labor in their particular group. On the other hand, scopolamine, if useful at all is useful in cases of inertia and extreme susceptibility to pain.

As regards the occurrence of abnormalities, those in the author's series comprise: forceps 66 or 16 per cent breech 9 or 2.02 per cent face 3 post partum hemorrhage 4 or 1 per cent contracted pelvis 7 persistent occiput posterior position 6 acute chorea 1 chronic chorea 1 eclampsia 6 epilepsy 5 pyelitis 1 pulmonary tuberculosis 3 lobar pneumonia 1

exophthalmic goiter 1 heart-disease 2, syphilis 3 and hydatidiform mole 1. None of these can be said to have been caused by the use of scopolamine.

Regarding the effect on the consciousness of pain and the effect on the mind of the mother the author's results were as follows: (1) complete relief of pain 64 or 75.3 per cent; (2) great relief of pain, sleep between, patient waking during height of contraction 23.6, or 57.5 per cent; (3) marked relief but no sleep 6.9 or 17 per cent; (4) no effect 4.1 or 10 per cent; (5) delirium 5 cases.

In considering these results and the low percent age of occurrence of amnesia, one point needs emphasis. The author never deliberately pushes the drug with the object of obtaining amnesia, but uses it with the idea that its object is accomplished if the patient sleeps between pains and awakens during them. The harmful effects so often obtained result from endeavoring to get amnesia in all cases.

The author suggests that scopolamine be withheld if the patient shows any marked reaction on the stimulative side such as delirium, inconsequential talk, or even the well-known atropine flush which often appears after the first dose in those patients in whom a second dose causes delirium.

The conclusions are: (1) Scopolamine is a useful sedative, not anæsthetic, when not pushed to the extreme of physiologic tolerance. (2) Under these conditions it is without danger to the child. (3) It does not have a retarding influence upon the progress of labor. (4) Suggestion should be avoided. (5) Injurious mental results can and do commonly occur and care should be taken to avoid its use in patients whose make up suggests such possibilities.

EDWARD L. CORVILL.

Valens, J. A. Pituitrin in Labor. *Bull. M. Soc.* 96 Jul 3.

The author draws the following conclusions as to the use of pituitrin in labor:

1. It enables the doctor to use general anæsthetic to lessen the suffering of the patient in many cases where he could not otherwise give it on account of stopping the progress of the confinement. Pituitrin stimulates the contractions, hastens the progress of the delivery and at the same time allows the use of a general anæsthetic. This in the author's opinion makes pituitrin one of the greatest medicines discovered in later years.

It should not be given without a general anæsthetic unless in very small doses, and even then it is preferable that an anæsthetic be given.

3. The size of the dose should be governed by the condition of the case.

4. In opposition to many writers, the author believes the extract of the pituitary has a large place in so-called normal labor.

5. He has never seen a cyanosis or any sign of severe compression of the fetus in connection with its use.

6. The extract produces strong intermittent contractions the contractions often prolonged above

the normal especially when a large dose is given. Labor seems to set in at physiologic hour etc.

7. No sign of tetanic uterine contraction occurred in any of the above cases.

8. Used in only one case of miscarriage of two months standing to produce placental separation had no effect whatever.

9. No sign of any rupture of the uterus noted but the above belief might possibly occur in cases of obstruction with too large a dose of the extract.

10. Action begins in from three to six minutes and lasts from twenty to thirty minutes.

D. H. BORD.

MISCELLANEOUS

Gandino, N. T. F. d. A Case of Intra-uterine Crying. (L. asc. de gent. ut. terine) P. mid Argent. 9 Jul 15.

Intra-uterine crying is such a mysterious phenomenon that its existence is denied by many who have never had the occasion of observing it.

The interruption of the circulation of the umbilical cord causes the fetus to become venous. This causes an asphyxia which produces reflexly an inspiration and an expiration. This is the cause of the local cords are tense and determine the cry.

The case cited was that of a lady, Gandino, 29. The woman was a multipara who had four pregnancies terminating in term. The fifth was a twin pregnancy the first fetus was stillborn the rupture of the second bag of water took place five days later and it was at that time that the intra-uterine cry could be heard and it was repeated when the forceps were introduced to terminate the labor. The fatal cry was similar to that of a suffocating person.

In the discussion several speakers gave their opinion regarding the questionable occurrence of intra-uterine crying. It was urged that this also be put on record.

W. A. BORD.

Hymanson, A. and Kahn, M. Lipoid Content of Maternal and Fetal Blood. *Am. J. Obst. & Gyn.* 96 April 1.

After a general discussion of this subject with a description of the technique used in their tests the authors conclude as follows:

The data from their experiments carried out show that on an average the total lipid content of the maternal blood is less than the total lipid content of the newborn infant's blood, the figures being respectively 4.75 and 4.8 parts of fat per thousand parts of blood. The cholesterol content on the other hand shows, in general the opposite state of affairs, i.e. 1 part of cholesterol per thousand parts of infant blood and 2.9 cholesterol per thousand parts of maternal blood.

The authors believe that the chorionic villi have the function of discriminating which part and how much of each lipid shall pass into the fetal circulation.

C. H. DAVIS.

DeLee J B : A Bacteriologic Study of the Causes of Some Stillbirths Preliminary Report
J Am M Ass 1916 lxvii 344

Thirteen years ago the author saw a child of a healthy mother born with a temperature of 101, which within a few hours rose to 103. The child died of streptococcic septicæmia, the mother showing no signs of infection. A year later a physician's wife after a mild pharyngitis developed albuminuria and eclampsia. Artificial delivery was performed. Out of the child's nostrils pure pus exuded. The pneumococcus was found in it. Several other cases have indicated that the child can become ill independently of its mother and may even die the mother being only indirectly affected or not at all.

This opens up an immense field for study that we may thus find the cause of many cases of so-called 'habitual abortion' and repeated premature labor after viability and before term, and that we may discover new problems of immunity local infections nephritis during pregnancy eclampsia, puerperal sepsis, blood borne transmissions and new aspects of the transmissions of bacteria.

EDWARD L. CORNELL.

Decree: A Case of Obstetrical Paralysis (Un caso de parálisis obstétrica). *Siglo med* 1916 lxi 360.

The case is reported of an infant of two months which at birth did not move the right arm. The family physician stated that the birth had been protracted and that axillary traction was necessitated.

This traction occasioned traumatic lesions of the shoulder resulting in the arm being completely pendulous and absolutely immobilized.

In these cases Decree avails himself of Gault's procedure which is to place the shoulder in a position of extension abduction and external rotation forming a right angle with the arm. This position is maintained by means of a ring which takes the form of a banneret at the end of a pole and which serves also to keep the arm in the position indicated.

After 15 days more or less movement begins to be noted since there is a restitution of the articular elements. Reduction alone as in this case, suffices generally for complete restitution. If the immobility has occasioned trophic or degenerative lesions electrotherapy is indicated.

W. A. BREXVAX.

Thomas, T T : Obstetrical or Brachial Birth Palsy. *Am J Obst N* 1916 lxxiii, 577.

The author reports 11 cases of brachial birth palsy and gives an interesting review of the literature

together with his views regarding the etiology and treatment of this condition. He rejects the plexus theory for most cases.

His interest in obstetrical palsies resulted from observations on adult brachial palsies from injuries to the shoulder region. He claims that a palsy due to injury to the shoulder region and associated with an ankylosis of the shoulder joint which disappears with the restoration of normal motion to the shoulder joint must be due to an injury to that joint. He believes that this conception also applies to obstetrical palsies, and that the treatment based upon it is the best.

The author bases his treatment upon the simple principle of restoring as nearly as possible the normal function of the shoulder joint. From an experience with 24 palsied arms in 23 patients he found that when there was no displacement in the shoulder joint a perfect recovery could be obtained from exercise alone. In all of his cases of birth palsy with the typical internal rotation of the limb and the characteristic limitation of abduction and external rotation as old as two or three years he has not yet failed to find present a posterior subluxation of the shoulder joint.

The strongest evidence of a traumatic origin at birth of these subluxations is the bending downward and forward of the anterior portion of the acromion which is practically always present. An injury to the brachial plexus cannot explain it. It is obviously due to the same pressure which pushed the humeral head backward during delivery. A ray will not show the bent portion of the acromion as the patients are too young. However he has found it by operation every time except on a patient in whom the acromion showed distinct evidence of pressure. The absence of the normal humeral prominence under the posterior edge of the acromion and the bending downward and forward of the anterior portion of the acromion will establish the diagnosis of a posterior subluxation. It is important to recognize it at or soon after birth and its diagnosis is so difficult then for the reasons already given, that he does not hesitate to mildly etherize the young patient in order to assure the diagnosis. In doubtful cases he takes advantage of the anæsthetic to make sure the humeral head is in good position and fix it there for six weeks by a light cast with the arm in abduction and external rotation.

Operative reduction of these dislocations is in its infancy and as yet no method of operation has received much attention.

C. H. DAVIS.

GENITO-URINARY SURGERY

ADRENAL, KIDNEY AND URETER

Payne R. L., J.: Unilateral Hematuria Associated with Fibroids and a Multiple Microscopic Calculi of the Renal Papillae. *Surg. Gynec. & Obst.*, 9 6 xiii, 76.

Reference is made to previous experimental work by the author in which acutely developing vascular lesions were eliminated as cause of symptomless unilateral renal hemorrhage.

The author then reports a case of symptomless unilateral hematuria in which dissection of the kidney showed microscopically a normal cortex and parenchyma but every papilla presented a cherry red appearance typical of angioma.

The kidney was removed and careful microscopic studies disclosed an absence of pathological findings in the cortex or parenchyma proper but the papillae showed definite chronic inflammatory changes.

These changes consisted of (1) an overgrowth of connective tissue (2) multiple microscopic calculi (3) dilated capillaries with the small blood vessel in close apposition or the capillaries surrounded by the connective-tissue proliferation (4) a network of dilated capillaries on the surface of the papillae many of which were ruptured with free blood escaping.

These numerous though small varices were evidently the source of the hemorrhage and the inference is that the numerous calculi, aided by the connective tissue they had originated, succeeded in causing an obstruction to the venous return with subsequent dilatation of the capillaries and resulting varicoidities.

The paper is illustrated with microphotographs showing the microscopic calculi, the connective tissue proliferation, and numerous dilated capillaries which have ruptured on the surface of the papillae with free blood escaping.

The author claims that this is the first case recorded in which there is definitely shown the cause and source of a symptomless unilateral hematuria.

The facts presented would lend further weight to the contention of those who believe chronic inflammation to be the cause of unilateral renal hemorrhage.

Bissell, D.: Surgical Replacement of the Pro-lapsed Kidney. *Surg. Gynec. & Obst.* 19 6 xiii, 100.

The approach to the kidney advocated is by exact dissection of the tissues in the lumbar region occasioning the least trauma, or injury to the tissues encountered, at the same time facilitating deep manipulation in delivering the kidney.

The skin incision is four inches—beginning at a point immediately above the angle formed by the last rib and the erect spine and extending to a point immediately above the right triangle. The terminal fibers of the latissimus dorsi are now incised along the line of their attachment to the erector spinae and the muscle is transferred to the center margin of the wound. A section is next made in the upper area or superior triangle of the lumbar fascia immediately below and parallel with the twelfth rib this dissection being extended inward and outward as far as may be found necessary. The lateral curve usually found to the inner side of this incision. The kidney is then directly approached by blunt dissection through the fatty capsule. The finger is hooked into the cellular tissue about one of the poles preferably the upper and the organ delivered. The fatty capsule is completely freed from its attachment to the kidney and a crescentic incision of the fibrous capsule is made on the posterior surface extending almost from pole to pole and the two margins of the bladder. Two stainless steel sutures of egret like dyed silkworm gut are passed completely around the poles penetrating the attached portion of the fibrous capsule at several points to fix their position. When the kidney is replaced these sutures are passed through muscle, fascia, and skin and tied over a bolster of rolled muslin gauze.

The protractor shield, formed by the crescentic portion of the fibrous capsule separated from the posterior surface of the kidney is sutured to the under surface of the lumbar fascia to prevent the fatty capsule which is not removed but forced anteriorly from wedging between the raw posterior surface of the kidney and the sheath of the quadratus lumborum. The fascial incision is closed with a continuous suture of plain catgut No. 1. The latissimus dorsi is sutured to its original position with plain catgut No. 1. The skin should always be united with a permanent suture as the edges of the upper portion will separate by pressure from the bolster of gauze if the suture material is soluble. The silkworm gut sutures are tied on the inner side of the looper on the nineteenth day after operation and the patient is allowed to get out of bed immediately. The sutures are removed any time within the next two days.

Abell, I.: Giant Ureteral Calculi: Anomalous Development of the Genito-Urinary Tract. *Surg. Gynec. & Obst.* 9 6, xiii, 33.

The case reported was that of a male white aged 32 whose personal history was negative for acute severe illness and venereal infection. The patient

applied for relief of pain in his back of ten days duration. Irregular left lumbar pain was first noted at 18 at 28 similar pain was noted on the right side. Latterly pain recurred monthly never sufficiently severe to require opiates and until the present attack persisting only a day or two. Herebefore relief had been afforded by rest hot baths hot water bottle etc. Between paroxysms there was urinary frequency four to five times daily during an attack once to twice daily. Blood was noted in the urine on a number of occasions.

The patient was thin but well-developed and muscular pulse 100 temperature 100.2 F heart and lungs normal right kidney palpable tender apparently as large as a medium-sized grape fruit. The left kidney not palpable no tenderness on that side. The urine was a muddy color acid s.g. 1.020 marked trace of albumin occasional blood and pus cells calcium oxalate crystals amorphous phosphates moderate number of bacteria.

Cystoscopy showed that the bladder was practically normal the left ureteral orifice appeared normal the catheter readily entered the renal pelvis. The orifice of the right ureter was oedematous the catheter encountered obstruction at 2.5 cm. The urine from the left kidney showed no albumin nor pus an occasional blood-cell blood count normal.

Radiography of the calculeous pelvic portion of each ureter showed the left to be of moderate size the right extended from the sacro-iliac joint to the meniscus. The diagnosis was bilateral ureteral calculi right-sided hydronephrosis.

The operation consisted of a bilateral gridiron incision enlarged downward by incising the rectus sheath the peritoneum was displaced medially the ureters were approached extraperitoneally. There was considerable thickening about the right ureter and it was separated with difficulty from the surrounding structures. The ureter was incised at the pelvic brim and the calculus removed by traction. After a similar procedure on the left side the ureteral incisions were closed by interrupted catgut. The external wounds were drained by strips of rubber sheeting.

The post-operative history was uneventful the patient resuming work at the end of the third week. The right calculus was oblong with a distinct curve at either extremity length 7.5 cm circumference 7 cm weight 24 grams the left stone was more ovoid weight 2 grams.

The literature shows that Desguin removed ureteral calculus irregularly triangular 36 by 23 mm weighing 10 grams Baker 94 grains Parker over 3/4 ounce Bovee, 2 3/4 by 1 1/4 by 1 1/4 inches weight 1,310 grains Buerger (1) more than four inches long 6 mm. to 1 cm. in diameter (2) 2 3/4 inches long by 1 3/4 inches wide Specklin 11 cm long weight 51 grams Federoff length 19 cm, weight 53 grams Rovsing length 18 cm width of a bean Israel (1) length 13 cm circumference 9 cm. weight 54.4 grams (2) length 17 cm circumference 9 cm. 10x11 weight 34.5 grams

Lloyd length 5.5 inches circumference 2.5 inches Morris nearly 6 inches long (libson 3/2 inch in diameter nearly round.

The second case occurred in a female white aged nineteen who had been married three years with no pregnancy nor menstruation. The first attack was diagnosed as appendicitis. When the second attack occurred the patient was taken to the hospital. Her pulse was 120 temperature 103 F abdomen markedly distended exquisite tenderness in the lower zone. While her figure was typically feminine examination revealed the absence of a vagina the external genitals were normal in appearance. The urine was acid trace of albumin slight sediment few blood-cells many pus cells and rod-shaped bacilli. The blood count showed haemoglobin 90 per cent white cells 10,500 polynuclears 82 per cent. The tender mass in the left pelvis was thought to be retained and infected menstrual secretion.

Celiotomy with median incision disclosed a pelvic kidney in front and to the left of the sacro-iliac synchondrosis. The right kidney uterus tubes, and ovaries were absent. The appendix was removed. The operative finding was pyelitis in a single pelvic kidney.

Three weeks later urine from the ureter and the bladder was negative upon culture. Radiography showed the renal pelvis to be normal in size and shape with a single ureter three or four inches long. A cystogram showed the bladder pressing upon the kidney the latter producing a variation in the normal vesical outline. The rectum was in the right pelvis.

In the literature Anders cites one case of single kidney based upon 92,690 autopsies the occurrence of the anomaly was one in 1,817. He refers to 285 cases in the literature. Among 36 gross renal and ureteral anomalies in the Mayo clinic during five years 12 were horseshoe and 6 single type. Thomas reports a case of pelvic kidney in a female diagnosed prior to operation for pelvic disease the vagina and uterus absent. Cullen mentions a case of a girl of seventeen with right pelvic kidney vagina uterus and left kidney absent tubes and ovaries prolapsed in the inguinal region. Blissell successfully reimplanted a right pelvic kidney. A single kidney has been observed at autopsy by Ward Glazebrook Secher, Stengel and others. Lolk removed a single right kidney located in the pelvis the patient perishing after thirteen days of complete anuria. Mayer and Nelkin speak of subperitoneal traumatic rupture of a solitary right kidney.

BLADDER, URETHRA AND PENIS

Granger A.: The Use of Oxygen in Cystography, with a Preliminary Report on the Use of Oxygen in Pyelography *Am J Roentgenol* 1916 III 351.

Beginning in 1900 the author began using washed and filtered air to distend the urinary bladder in an effort to obtain better cystographs but found it was

abscesses with extensive destruction of tissues, long standing cases of hard fibrous sclerotic vesicles, cases in which the vesicle and ampulla are produced by symptoms referable to the ureter and selected cases of extreme nervous origin unaltered by the usual treatment.

Vasculotomy is considered in all cases of spermatorrhea, all cases of pus and blood in the ejaculate and following massage and in the acute catarrhal and suppurative types. H. G. HAWES.

Crowell, A. J. Urinary Retention Due to Prostatic Obstruction. *Urol. & Gynec. Rev.* 9, 6, 11, 55.

In the first type of prostatic obstruction, prostatic abscess, the author believes that the prostate should be drained perineally without opening the urethra. In the second class of cases, prostatic hypertrophy the author believes in perineal prostatectomy for the reason that the wound and the kidneys are both drained from the most dependent point, the perineum. He believes that the mortality following the perineal operation is not as great as that following the suprapubic. If the prostatic hypertrophy is accompanied by an abscess of the prostate the abscess cavity also can be better drained through the perineum.

In malignant disease of the prostate a tenillon is called to the fact that the prostate, its capsule, the seminal vesicles, and the bladder trigone can all be removed perineally. In performing this operation the growth may be entirely removed, the only drawback being that incontinence of urine usually ensues. He recounts two cases in which he has used the Young punch to remove a prostatic bar. In one case a man of 82 who had had kidney function, 4 ounces of residual urine and was in poor physical condition, the punch operation was entirely successful. In the next case, a man 35 years of age who had 16 ounces of residual urine, the median bar was removed by the punch. After the operation he was able to empty his bladder without difficulty. B. S. BARRON, JR.

Gordon, G. S.: The Internal Sphincter Following Prostatectomy. *Surg. Gynec. & Obst.* 19, 6, 1221, 620.

After removal of adenomata through the internal sphincter the sphincter on regaining its full functional power often forms a raised crescentic fold which in ratio to its size obstructs urination, with the result that there still remains some abnormal back pressure at urination on the bladder, ureters, and kidneys which encourages the continuance of infection and interferes with renal secretion. Be-

hind this obstruction is a pouch of residual urine in which stone may form. If the free edge of the sphincter has been denuded and its purse string action is strong enough it may obliterate the outlet entirely and so that healing may occur. The author believes the obstruction should be dealt with at operation and he suggests the entire removal of this flap or that it be slit and applied to the denuded prostate bed.

MISCELLANEOUS

Beck, E. G. A Report of a Series of Unusual Fecal and Genito-Urinary Cases Treated by Bismuth Paste. *S. & G. Soc. & Obs.* 19, 6, 11, 507.

The author reports 38 cases, 17 post-operative fecal fistulae and 21 cases of urinary fistulae all treated with bismuth paste. Most of these were preceded by more than one operation, some of them by many. Most of these cases were known before the surgical society and the histories of the paper must be read in order to learn the most recent progress in technique in this treatment. It is only this way that the best result may be obtained and Beck has shown that can be accomplished under proper conditions.

The roentgenogram which illustrates clinically the past is instructive both from a diagnostic and therapeutic standpoint. It is shown that a bicus of the spine or the hip-joint may perforate the bladder and thus cause urinary fistulae through an opening about the hips.

In a series of post-operative suppurative fistulae after nephrectomy, the cases have invariably healed if they have waited for many years.

The cases of fecal fistulae reported detail a series of unusual types. In one case the entire digestive content had escaped from a laparotomy wound for months without any surgical interference caused by purely the bismuth treatment, the fecal fistula closed with unusual rapidity and the patient increased in weight from 90 to 180 lbs. within one year. In none of the fecal fistula cases did the author resort to any surgical treatment and only one case out of the series of seventeen could not be cured by this method, this being a fistula of the small intestine.

The author lays special stress on the technique which he has observed to be faulty and responsible in many cases of fistula which have come under his observation and from other sources.

Bismuth poisoning has not occurred in any of his cases and he believes it can be prevented in every last case.

SURGERY OF THE EYE AND EAR

EYE

Willmer W H : Three Years Experience in Sclerocorneal Trephining in Glaucoma. *Arch Ophth* 1916 xlv 333

Case histories of patients on whom sclerocorneal trephining for glaucoma was done are presented the author stating that by reason of the small number he has been able to carefully follow up the cases.

His results have been very favorable tension being lowered and pain relieved in nine eyes after the La Grange operation or iridectomy had failed and miotics had been used in many cases over periods of years.

He protests against the present unfavorable attitude toward the operation he believes that the pendulum is swinging too far to the opposite from the procedure a enthusiastic reception, and states that in his opinion sclerocorneal trephining is the easiest safest and most effective method yet suggested for permanently reducing excessive tension.

Late infections he believes, can be lessened by taking care to dissect up all the subconjunctival tissue with the conjunctiva in order to make the flaps as thick and protective as possible.

Synechiae lenticular opacities, hemorrhages and relapses are said to be no more frequently met with after this than after other methods of operating and it has the advantages that both eyes can be operated upon at the same time the patient does not have to be long confined. It does not reduce the visual fields or cause astigmatism to an accountable extent there is only a negligible risk of the loss of vitreous and no danger of the escape of the lens and the operation may be repeated. S S HOWE.

EAR

Moure E. I : A New Method of Examining the Vestibular Labyrinth (Sur un nouveau mode d'examen du labyrinthe vestibulaire) *Bull de Acad de med* Par 1916 lxxv 413

For some years past Moure has made it a practice in examining the vestibular labyrinth to submit the patient to a series of experiments in which provoked nystagmus occupies an important place. According to the duration and intensity of the nystagmus and the time it takes to appear he deduces that the labyrinth is normally hyper or hypo-excitable.

The number of labyrinthine affections occurring during the war has afforded many opportunities for putting this method into use. W A BRENNAN

Hays, H : The Corroborative Diagnosis of Mastoiditis by Means of the X Ray. *A F M J* 1916 cli 1163

The author cites cases to show the value of the roentgenogram in corroborating the clinical evidences of mastoid disease. He does not insist upon the necessity of having an X ray taken before a diagnosis of mastoiditis can be made but he does consider it of more value than a consultation particularly in atypical cases or when weighing the evidence for and against operative interference. Besides this knowledge a roentgenogram shows the position of the sinus the size and shape of the mastoid and the extent of zygomatic cells. OTTO M. ROTT

Lent, E. J : Chronic Suppurative Mastoiditis Accompanied by Intracranial Pressure. *J Indl and St M Ass* 1916 ix, 290

A case is cited in which operation disclosed the presence of a large cyst apparently not dependent upon the middle ear infection, as the fluid in the cyst was sterile. The patient ultimately recovered after symptoms of meningeal irritation had supervened. The cyst was drained and later allowed to become infected after which the discharge was gradually lessened in amount and finally ceased.

The author briefly discusses the question of cerebral cysts dividing them into four classes (1) parasitic, (2) traumatic, (3) apoplectic (4) and degenerated neoplasms.

1 Parasitic cysts are due either to the cysticercus or echinococci.

2 Traumatic cysts are not very clearly defined in origin. They may be explained on the ground of long-continued circulatory disturbances with consequent local accumulations of serum, or shrinking of cerebral tissues in the region of injury the result of sclerotic changes in the cerebral substances the contraction leading to the formation of a vacuum which becomes filled with fluid derived from the surrounding membranes.

3 In apoplectic cysts the blood-clot contracts and changes from a red to a brownish color due to the transformation of the hemoglobin into hema-toidin. The pigment is diffused in the neighboring tissues giving a yellowish tinge the detritus is transformed and absorbed so that a cavity remains containing fluid, the so-called apoplectic cyst.

4 In degenerated neoplasms cysts may be found on microscopic examination to be the end result of an almost complete degeneration of a glioma.

OTTO M. ROTT

SURGERY OF THE NOSE THROAT AND MOUTH

NOSE

Kyl J J Bacteriology f N sal Sl u Disease
C l f Sl J M d[illegible][illegible]

x m m s t t h m s t l n d f r o n t a l
 i l n h i s e s o r t h p h
 t h h l i b t m m g n d f o l l w
 t h l l l f e e t f i b n i g h
 l h i b t h s e t t p e i t e
 l t h h i r a o t n t h e
 t b h g e a s e

THROAT

Dechard H B Secondary Tonsillitis Hemorrhage

[illegible][illegible]

from escaping from the tonsil into the pharynx and to keep the pharynx free from blood during the operation

ELLEN J PATTERSON

Mayer E. Angioma of the Larynx. *Med Rec* 1916 lxxix 1084

From a study of his own case and the forty others found in the literature the author reaches the following conclusions

1 Angioma of the larynx is a rare disease occurring mostly in adults and the proportion of males to females is approximately four to one

2 It may be mistaken for cancer

3 Endolaryngeal removal of a portion of the growth for diagnosis, or its complete removal in this manner is fraught with danger and may have serious results.

4. Laryngofissure, removal and suturing the mucosa, are entirely safe and feasible procedures.

OTTO M ROTT

MOUTH

Mayes, W. C. and Wilson W. and C. F.: Focal Infections. Results of Overcoming Same. *South M J* 1916 lx 400

Many diseases, the etiology of which has been obscure are due to metastasis or absorption of toxins from a primary focal infection and in order to conserve the best body economy it is essential not only to treat symptoms but to remove the primary focus or at least overcome the infection.

In diseases due to focal infection if a cure is not effected by the removal of a diseased focus or if further metastases occur then further search must be made for another focus by exhausting every aid the laboratory X-ray and one's diagnostic ability afford

If for anatomical reasons the focus cannot be removed or the infection is same controlled, often the removal of a diseased tonsil or the draining of an apical dental abscess or accessory nasal sinuses will allow the body economy so to recuperate that a cure will be effected in the original offending focus

ELLEN J PATTERSON

Horsley J S.: Cancer of the Mouth and Tongue with Special Reference to Metastases in the Neck. *South M J* 1916 lx 512

An account is given of eight cases of carcinoma of the mouth and tongue illustrated by post-operative and micrographical results of the pathological sections.

The author lays stress on the harmfulness of the procedure of excising a specimen of the growth and allowing some time to elapse before operation is done. In case pathological examination is necessary for the diagnosis he advises that the excision of the specimen be done with the canterly and the complete operation follow immediately

In the three cases which are alive and living from one to four years after operation there was no primary incision for diagnosis made. The five who are dead all had incisions made into the tumor mass to confirm the diagnosis.

The results of operations for carcinomata of the floor of the mouth are discouraging unless a wide dissection is made including in the block a part of the jaw bone. The author has found that the slow cautery is the best method of dealing with massive recurrences.

HARRY G SLOAN

Hofmann, E.: Melanosarcoma of the Buccal Mucosa (Melansarkom der Mundschleimhaut). *Munchen med Wchnschr* 1916 lxxli 322

The case reported by Hofmann was in a man of 58 who in January, 1911 presented himself with a tumor which had first appeared about a year previous. This was situated in the external part of the ascending branch of the maxillary about the size of a cherry hard, dark-colored and with linear radiating furrows. The tumor with the proximate tissue was extirpated under local anesthesia by the galvanocautery. In the following week the dark lines which traversed the velum were cauterized and an energetic salvarsan treatment instituted. Two months after the first operation a dark discolored spot showed in one of the extremes of the cicatrix which had resulted after the operation.

The tissue in which this spot was situated was circumscribed by the thermocautery and removed radiotherapy treatment being instituted later. Histologic examination showed that this tissue as well as the original tumor which was removed was typical melanosisarcoma.

The patient was lost sight of until 1915. For about a year the patient lost weight rapidly losing 45 kilos in weight in little more than a month. Blackish streaks were ejected in the expectoration and microscopic examination of these showed melanic nuclei identical with the primary tumor.

In the lobule of the left lung there were catarrhal manifestations which suggested the existence of metastases. The patient was again put under salvarsan treatment

W. A. BRENNAN

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